An Evaluation of the Effects of a Video Self-modelling Intervention in the Teaching of Game Management Skills to Adolescent Umpires

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Abbreviations

FF: Feedforward

IOA: Interobserver agreement

MTT: Mental Time Travel

PND: Percentage Non-overlapping Data

PSR: Positive self-review

VSM: Video self-modelling

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Abstract

Game management skills are an important aspect of umpiring across levels and sporting codes. Research evaluating programmes to teach game management skills to umpires is lacking, however. Feedforward video self-modelling (FF VSM) is one intervention which appears to promote rapid learning through Mental Time Travel. This study assessed a FF VSM intervention in the context of teaching of game management skills to adolescent netball umpires. A single case, multiple-baseline design was used with eight female netball umpires aged between 14 and 18 years. Behavioural observation and video filming was undertaken at their local netball courts. During the intervention phase, the participants viewed their VSM videos. Game management skills were evaluated using video footage of the participants umpiring. Pre- and post-intervention self-report measures of self-efficacy to umpire, motivation to umpire, satisfaction with game management skills and self efficacy to manage challenging match scenarios were also taken. Results indicated an increase in overall game management skills for seven participants and an increase in self-efficacy and satisfaction for five participants. The results support further development and evaluation of VSM for netball umpires.

Chapter 1: Introduction and Literature Review

Around the world, organisations are seeking to increase participation in sport (Cuskelly & Hoye, 2013). There are several potential benefits of increased physical activity, including the opportunity for improved physical, psychological and social wellbeing of individuals (Bailey, 2006); and reduced health-care costs for governments (Bauman, Armstrong, et al., 2003). The adolescent population in particular appears to have a higher proportion of individuals who do not participate in regular moderate to vigorous physical exercise (Richards, Reeder, & Darling, 2004). In the face of increasing rates and associated costs of preventable diseases, such as Type 2 diabetes and heart disease, governments have begun targeting participation in physical exercise (Roberts & Barnard, 2005). In New Zealand in 1999, for example, the Hillary Commission introduced a nation-wide *Push Play* campaign in order to reverse the decreasing trend of physical exercise participation and to promote exercise-related health benefits (Bauman, McLean, et al., 2003).

Competitive and social sport is reliant on umpires to facilitate fair matches and ensure player safety. Growth in sports participation by players, however, must be accompanied by corresponding increases in participation of sports officials. Sports officials include administrators such as allocators; technical officials such as scorers, timers and callers; team officials such as coaches; and match officials. Match officials are referred to as *referees* in sports such as rugby and football, or *umpires* in sports such as cricket and netball. As this thesis pertains to netball, the term *umpires* will be used primarily. Umpires are a fundamental part of sports, responsible for facilitating matches and ensuring player safety (Cunningham, Simmons, Mascarenhas, & Redhead, 2014). The role of an umpire includes application of the rules, fulfilment of match protocols, timely and accurate decision-making, and the management of disputes and dangerous play (Guillén & Feltz, 2011) in each match that the umpire is assigned to.

The knowledge and skills required to umpire successfully are constantly evolving with the nature of the game. Over time, umpires must adapt to rule changes, which are often implemented to improve player safety or the flow of the game. For example, in 2007, the International Rugby Board implemented a new scrum law in order to reduce scrum collapses and force of impact on players. This action had some success in reducing scrum-related injury claims to the Accident Compensation Corporation in New Zealand (Gianotti, Hume, Hopkins, Harawira, & Truman, 2008). In netball, changing the footwork rule may reduce the high rate of anterior cruciate ligament injuries among netball players (Otago, 2004). Rule changes implemented by sport governing boards are supplementary to any alterations to umpire protocols or current rule trials.

Umpire recruitment, training, participation and retention are therefore crucial to the sustainability of sports and to the safety of players who participate in organised sport. There appears, however, to be a shortage of umpires in many sporting codes (Kendall, Knust, Ribeiro, & Urrutia, 2010). The rate of umpire participation in Australian sports, especially for female umpires, is projected to fall more rapidly than those of other sport volunteers such as coaches (Australian Bureau of Statistics, 2002; Cuskelly, 2004). Data from New Zealand populations or in the code of netball is yet to be made available, although anecdotal evidence from community netball organisations suggests a significant lack of umpires in netball in New Zealand. Umpire attrition rates must be addressed to allow individuals to participate in sport at all levels of competition.

According to findings from the Australian Sports Commission (2004) and Kilani, Altahayneh, and Mo'een (2013), a commonly cited factor in umpire attrition is the verbal or physical abuse of umpires by players, coaches and spectators. Abuse of umpires may be preceded by, or reflect, player frustration (Simmons, 2006). Abuse may also be associated with compromised umpiring performance (Friman, Nyberg, & Norlander, 2004) and

increased stress and burnout (Taylor, Daniel, Leith, & Burke, 1990). Therefore, the abuse of umpires may indicate player or coach dissatisfaction, and lead to poorer performance and reduced psychological functioning for umpires. Other factors cited in the literature concern the time commitments involved in umpiring and the challenging nature of the umpiring role (Cuskelly, Hoye, & Evans, 2004). Player and coach dissatisfaction, umpire abuse, time commitments and role demands may lead to reduced participation in sport by umpires and players alike, threatening the viability of sporting codes.

Given the detrimental outcomes for players, umpires and the future of competitive sport, an intervention is needed to aid sports organisations and umpires in the prevention and management of abuse and attrition of umpires.

New Zealand Context

Sport is an important part of traditional Maori culture and general New Zealand culture. Traditionally, Maori communities in New Zealand participated in sports such as canoe racing and swimming for both leisure and skill development (Papakura, 1986). Today, numerous sportspeople of a range of ethnicities are considered "national heroes" in New Zealand, and there are high levels of national pride and recognition for New Zealand sporting teams across a range of nationalities (Thomas & Dyall, 1999).

In New Zealand, sports of rugby and netball are particularly celebrated as they are the primary sports for males and females respectively. Netball has been referred to as "the national sport for women" since 1929 (Wanganui Herald, 1929, cited in Nauright & Broomhall, 1994). The sport of netball has been widely encouraged in New Zealand, as it was believed to provide women with exercise and required little space or funding (Nauright & Broomhall, 1994). More recently, netball matches have been shown live on television and the popularity of the sport has continued to grow, especially for adolescents. In a sample of 1730 females aged 12 to 17 years, 41% of participants played netball ahead of all other sports

(Richards et al., 2004). Recently, Netball Mainland stated that its mission is "to increase participation and profile of netball in the Mainland Zone while fostering a winning culture and the pursuit of excellence" (Netball New Zealand, 2015), indicating a vision for the continued development of netball. As the sport of netball continues to grow in New Zealand, it requires sufficient numbers of qualified umpires for it to thrive.

Review of Umpiring Literature

To review the umpiring literature, a literature search was conducted through the SportDiscus database. Key search terms were "umpire" OR "referee", AND "retention" OR "attrition" OR "abuse". Relevant articles generated from this search were examined for further related references. Articles relating to umpire retention, attrition or abuse are reviewed below.

Rates of umpire retention and attrition. Individuals may adopt an umpiring role because they are dedicated to the sport, and umpiring allows them to contribute generously (Dosseville, Rioult, & Laborde, 2013); or because their children are involved in sport (Cuskelly, 2004). Many individuals volunteer as umpires each year (Sport New Zealand, 2015), some as young as 12 years of age (Cuskelly et al., 2004; Simmons, 2006). However, Cuskelly and Hoye (2013) reported that most umpires cease involvement after less than five years in the role. While most sporting organisations have no available quantitative data on umpire attrition, annual turnover estimates range from 20% to 33% in sports of football, ice hockey and volleyball (Australian Football League, 2003; Forbes & Livingston, 2013; VanYperen, 1998).

The trend of umpire attrition seems to be widespread, with 85% of North American high school sport administrators reporting decreased numbers of officials registered (Sabaini, 2001). Another study in the United States indicated that more than 85% of umpires of competitive high school sports would consider withdrawing from umpiring if faced with a

worsening environment of verbal and nonverbal misconduct (Hughes, 2001). According to anecdotal evidence, first year umpire attrition rates may be up to 60%, as most umpires leave either after realising that they had underestimated the training and commitment requirements for the role, or after their first experience of umpiring a match (Cuskelly et al., 2004). In a study examining high school sport in the United States, results indicated that around one third of all sports officials cease involvement after their first year (Sabaini, 2001). Data provided by a local netball centre in New Zealand indicated that umpire attrition rates in 2015 were higher among less qualified umpires. These high rates of attrition in beginner umpires have resulted in a shortage of umpires that is present in a variety of sports (Kendall et al., 2010).

Umpire shortages tend to have negative effects for sports organisations. Even low levels of umpire turnover results in increased costs for sports associations who must continually recruit and train new umpires (VanYperen, 1998) in order to provide cover for all necessary matches. Covering the financial costs of recruiting and retraining new umpires or neglecting to address the situation could threaten the viability of both individual sporting associations and entire sporting codes (Titlebaum, Haberlin, & Titlebaum, 2009). Umpire shortages may also place pressure on current umpires to volunteer more of their time in order to cover matches. An early study by Taylor and Daniel (1987) reported that around half of the 215 sports officials in their sample spent 13 to 18 hours per week involved in umpiring their respective sports. More recent self-report data suggested that umpires commit to five matches each week on average while allocators, who are often volunteers themselves, struggle to assign competent umpires to matches (Cuskelly et al., 2004). Furthermore, a lack of qualified umpires could place players at risk if unqualified umpires are employed to control competitive and physical matches. Overall, these findings signify that the retention of umpires, especially in the initial training years, is an issue across sporting codes. Were these

trends of umpire attrition to continue, the future of competitive sport and umpire development would be hindered by a lack of personnel.

Factors facilitating umpire retention. The retention of umpires is important as it requires much less time and fewer resources to train and retain one skilled volunteer over five years, than it does to search and retrain five new and inexperienced volunteers every year (Turner & Chelladurai, 2005). To retain umpires, there must be an incentive for umpires to continue despite challenges. Two factors in particular have been identified in the literature as being predictive of umpire or volunteer retention. These factors are motivation and satisfaction.

Deci and Ryan (2008) have developed the self-determination theory in which different types of motivation predict engagement in behaviours, such as umpiring. This empirically-supported theory concerns autonomous motivation (engaging in an activity with eagerness), controlled motivation (engaging in an activity as a function of reward and punishment), and amotivation (lack of motivation). In a descriptive study, Wolfson and Neave (2007) identified that soccer referees remained involved for intrinsic reasons such as a "love" of the game of soccer. Extrinsic factors such as monetary rewards, power, and recognition did not emerge as motivational factors for the sample used. Similarly, 70% of a sample of basketball referees reported that they continued to umpire to express their love of the game and to maintain fitness (Burke, Joyner, Pim, & Czech, 2000). Most umpires who were sampled appeared to demonstrate autonomous motivation to umpire as defined by Deci and Ryan (2008) and were not as motivated by aspects of reward and punishment.

Empirical studies have also demonstrated links between motivation, satisfaction and retention of volunteers. Bang, Ross, and Reio (2012) investigated the relationship between motivation, satisfaction and retention with 254 individuals who volunteered for a 2004 marathon event. Results indicated that individuals who volunteered as an expression of their

values, in order to gain community work experience, or for love of the sport were more likely to have higher scores of satisfaction. Volunteer satisfaction in turn appears to be associated with retention of volunteers. A further study by Bang et al. (2012) suggested that volunteer satisfaction partially mediated the relationship between motivation and commitment, emphasising the importance of motivational and satisfaction factors in volunteer retention. While these studies did not use a sample of umpires, findings suggest a link between motivation, satisfaction and retention.

Motivation can also be described in terms of social context which may influence adolescent sport participation in particular. One type of social motivation refers to affiliation experiences, or the development and maintenance of mutually satisfying relationships (Anderman, 1999). These individuals engage in sport in order to develop and maintain relationships with similar others and for opportunities to socialise. The second type of social motivation refers to social status and recognition. These individuals enter sport to gain approval or recognition from others or to increase their social standing (Allen, 2003). A cross-sectional study by Allen (2003) with 100 female adolescents aged 14 to 17 years (M= 14.67 years) highlighted the importance of social factors in the participation of female adolescents in sport and explored two types of social motivation. Findings supported the presence of both affiliation and social recognition types of social motivation. Perceived belonging was significantly and positively correlated with affiliation, social recognition, perceived physical ability, and interest/enjoyment in sport. Affiliation and social status also accounted for a significant amount of variance in interest or enjoyment in sport. Findings suggest that social context is significant in the retention of young people in sport.

By emphasising areas of social affiliation, social status, volunteer values, work experience, and the love of the game, it may be possible to enhance umpire satisfaction and, in turn, increase retention.

Factors in umpire attrition. There are several challenges to umpiring which may affect attempts to retain umpires. First, the role of an umpire is a demanding one (Dosseville et al., 2013). Umpires must rapidly make difficult and accurate decisions in an emotional atmosphere in close proximity to players and spectators, and must inspire confidence in the accuracy of those decisions (Cunningham et al., 2014). These decisions can take on even more significance when sport is a matter of national pride, when player salaries and sport funding are influenced by the outcomes of the match, or when the match is being scrutinised by the media (Mason & Lovell, 2000). Umpires must also meet the physical demands of the role which for elite umpires involves performing high intensity behaviours for much of the match, at 85% of their maximal heart rate and with a workload at least as high as the players' (Mason & Lovell, 2000). In addition to the mental and physical challenges of the role, umpires are also charged with maintaining order and resolving disputes throughout the match (Tuero, Tabernero, Guillén, & Márquez, 2002).

Second, umpires also invest their own resources into developing their skills and gaining experience, often voluntarily and accompanied by criticism (Kellett & Warner, 2011). In a variety of sports, umpires are expected to cover the costs of the required uniform, equipment, training and transport. Rural umpires in particular must travel in order to attend matches, especially higher quality matches (Cuskelly et al., 2004). Umpires are often not reimbursed for these costs and receive low pay, if any (Sabaini, 2001). Associated costs and low pay may deter umpires of all ages from entering the sport or continuing to participate.

Umpires also require a high level of commitment to the sport in order to succeed. For example, Patterson (2010) suggests that even with deliberate practice, umpires may require at least 10 years to develop their skills to an elite level. At junior levels, umpires may be expected to attend workshops and maintain fitness levels in order to participate in matches or tournaments. Umpires at a high level are expected to invest further time into personal fitness

regimes and mental preparation for matches (Mason & Lovell, 2000). As career and family demands increase, umpires may struggle to commit to their sport and decide to leave due to time pressures.

Lastly, umpires may be targets of abuse from players, coaches and spectators, creating a hostile atmosphere in which to perform. The abuse of umpires is now discussed.

Umpire abuse. It is commonly acknowledged in more recent literature that umpires are targets of aggression and abuse (Baldwin, 2013), and that abuse is a frequently cited reason for umpire attrition (Cuskelly et al., 2004). Abuse can be verbal (e.g. threats, insults) or nonverbal (e.g. physical aggression, gestures), and tends to come from players, coaches and spectators (Friman et al., 2004; Simmons, 2006). Descriptive results from a survey of Australian players, coaches, officials, spectators, and administrators involved in a variety of sports indicated that most violence in sport was verbal (Vamplew, 1991). The survey also revealed that of the 313 coaches sampled, 31% thought that the level of violence in sport was excessive. Conversely, some coaches perceived verbal violence as an appropriate mode of relieving frustration. These findings suggest that the abuse of umpires may not always be perceived as problematic by sports coaches. A 2002 survey from the Australian Sports Commission found that 78% of respondents (not described) had witnessed abuse of sports officials and 83% were of the opinion that not enough was being done to reduce or eliminate abuse (Cuskelly et al., 2004). At an elite level, Premier League referees have reported receiving abusive phone calls at home or work, or being escorted off the pitch for safety (Mason & Lovell, 2000). Abuse of umpires tends well-reported on at the elite levels in adult sport only; however, abuse of umpires appears to be present at all levels of sport (Bernal, Nix, & Boatwright, 2012).

Anecdotal evidence suggests increasing abuse of even the most junior umpires (Cuskelly et al., 2004), mostly by parents and coaches. Walters (2011) estimated that at 40%

of the 72 junior New Zealand sporting fixtures sampled, there were negative coach comments directed at the umpire. Umpires were the recipients of approximately 16% of all negative comments from coaches and parents, while most negative comments were directed towards participating children (Walters, 2011). An earlier study identified parents and coaches as the primary contributors of verbal abuse directed towards the umpire during a junior football match (Stoll, Beller, & Barmann, 1997). Results from an Australian study indicated that 26.5% of coaches of junior sport had observed parents verbally abusing sports officials and that this was an increasing trend (Vamplew, 1991). However, findings from Walters (2011) indicate that coaches were less likely than umpires to report incidences of inappropriate parental behaviour and less likely than umpires to have ongoing concerns about parental behaviour at junior sports. These findings suggest that parental abuse of umpires may even be underestimated in studies relying on coach-report data. Ultimately, the abuse of umpires appears to be present in junior levels of sport and to be perpetrated by parents and coaches.

From an umpire perspective, the interpretation of abuse may differ across individuals. Both qualitative and quantitative studies conducted with Australian and American samples have found that umpires across codes such as baseball and Australian Rules football expect and even accept abuse or aggression in their roles (Kellett & Shilbury, 2007; Rainey & Schweickert, 1990; Simmons, 2006). For example, in a study by Mason and Lovell (2000), seven of 18 Premier League football referees expressed that abuse was part of the game. Furthermore, the challenge of managing abuse may even function as a selection process, separating umpires who have the potential to succeed in the sport from those who do not. Some experienced referees have claimed that accepting and addressing one's mistakes and not taking abuse "personally" is part of umpire development, and that if an umpire cannot receive criticism well then he/she would never be successful (Simmons, 2006, p. 9). In a study by Kellett and Shilbury (2007), all of the 22 highly qualified Australian umpires of

Australian Rules football reported past abuse, yet they had not left the sport. It may be that these umpires had learnt skills to minimise or manage abuse early in their careers and therefore continued to gain experience to become successful umpires. For example, 10 of the 22 umpires interviewed stated that they "blocked it out" (Kellett & Shilbury, 2007, p. 221).

Despite the potential benefits of umpire abuse in terms of umpire selection, the abuse of umpires continues to emerge from the literature as a factor in umpire attrition. In addition to affecting immediate decisions made by umpires through providing cues for ambiguous decisions (Souchon et al., 2013), abuse of umpires may have a direct association with long-term umpire turnover, often measured through umpires' self-report ratings of *intentions to quit.* Findings from a recent study of over 2000 umpires in England indicated that approximately 50% and 25% of *current* umpires felt dissatisfied with spectator behaviour and player behaviour respectively, accounting for around 10% of intention to leave the sport (Pitchford, 2005). Umpires who had already left the sport were not included. According to a study of five sport organisations in Jordan, verbal abuse and fear of physical harm accounted for 17.7% and 9.1% respectively of the variance in umpires' self-reported intentions to drop out, using a sample of current umpires (Kilani et al., 2013). However, these studies relied on self-report data from current umpires around their intentions to leave umpiring; they did not investigate the actual attrition rates and contributing factors from umpires who had already left the sport.

Overall, most abuse received by umpires appears to be verbal, witnessed by parents and coaches alike. Some umpires appear to accept abuse as part of the role and view it as having value as selection process. However, umpires may be vulnerable to the underlying message that they are not valued participants of sport (Forbes & Livingston, 2013). Even low rates of abuse could influence umpire attrition, and may have other detrimental effects such as performance deficits, stress and burnout.

Abuse as a predictor of stress, burnout and attrition. Stress can be defined as the ongoing process of evaluating the demands of the environment and attempting to cope with those demands (Fletcher, Hanton, Mellalieu, Hanton, & Mellalieu, 2008). Burnout in athletes can be conceptualised as emotional fatigue or physical breakdown (Taylor et al., 1990). Numerous cross-sectional and longitudinal studies have been conducted with athletes on performance, stress, burnout and retention (e.g. Gustafsson, Skoog, Podlog, Lundqvist, & Wagnsson, 2013; Li, Wang, & Kee, 2013; Lu et al., 2016), but studies examining the association between stress, burnout and attrition in the umpire population have been lacking until more recently. Multiple studies conducted with umpires have instead focused on umpire bias or decision-making under specific conditions (e.g. Boyko, Boyko, & Boyko, 2007; Dawson, 2010; Downward & Jones, 2007; Hagemann, Strauss, & Leißing, 2008; Hancock, 2013; Johansen & Haugen, 2013; Johnston, 2008; MacMahon, Helsen, Starkes, & Weston, 2007; MacMahon, Starkes, & Deakin, 2007; Mascarenhas, Collins, Mortimer, & Morris, 2005; Pettersson-Lidbom & Priks, 2010; Schweizer, Plessner, & Brand, 2013; Souchon et al., 2013).

Initial research on stress in umpire populations focused on potential sources of stress for umpires. A preliminary cross-sectional study by Taylor and Daniel (1987) examined sources of stress in a sample of 216 Canadian soccer officials. Interpersonal conflict, fear of physical harm, peer conflict, role-culture conflict, fear of failure, and time pressures emerged as factors of stress for umpires. Results from several later studies in the United States suggested that factors related to confrontation, such as interpersonal conflict and fear of physical harm, were among the most common sources of stress for umpires (Rainey, 1995; Taylor & Daniel, 1987; Taylor et al., 1990). These findings suggest that verbal and physical abuse may be a significant source of stress for umpires. In contrast, sources of stress for South African football umpires were more likely to concern fitness, role-culture conflict, or

fear of failure, indicating some cultural differences in the emphasis placed on fitness requirements for the umpire role, and the fear of non-selection due to poor fitness and performance (Kruger, Emekci, Strydom, & Ellis, 2012).

As well as being a source of stress, results from cross-sectional studies using self-report data indicate that abuse of umpires is positively correlated with stress and burnout, which precede officials leaving their sport (Kahill, 1988; Rainey & Winterich, 1995). As umpires are exposed to more abuse, they may experience more stress and feel less able to cope with the demands of their environment. Over time, this may lead to feelings of emotional and physical exhaustion, and ultimately attrition. Findings from these cross-sectional studies were supported by a longitudinal study by Taylor et al. (1990), which examined the relationship between stress and intention to continue as sports officials. Results indicated that higher self-report stress ratings of soccer referees three months into the soccer season were associated with burnout, both at the time of measurement and four months later. Self-report ratings of burnout were also predictive of intention to leave umpiring. Additional findings from a study by Cresswell (2005) with 392 top amateur rugby players suggested that there may be a direct relationship between amotivation, intrinsic motivation, and burnout, whereby an athlete experiencing higher levels of burnout is more likely to report higher levels of amotivation and lower levels of intrinsic motivation. Thus, stress and burnout from the demanding umpire role may partially account for the relationship between umpire abuse and umpire attrition.

Stress and umpire performance. There are some inconsistencies in the literature concerning the level of stress experienced by umpires from different sporting codes during matches, however. Early studies using heart-rate to measure stress levels revealed that volleyball umpires encounter modest amounts of stress during a game (Gait, Cook, Allen, & Duncan, 1979). Results from Conti and McClintock (1983) implied that soccer referees have

significant increases in heart rate at specific, stressful points in the match, such as when a fight occurs. In contrast, later studies which used self-report ratings indicated that umpires of ice hockey, rugby, basketball, soccer and volleyball experience low to moderate levels of stress (Dorsch, 2007; Gencay, 2009; Rainey & Hardy, 1997; Rainey & Winterich, 1995; Stewart & Ellery, 1996). While this may suggest that umpires self-report lower levels of stress than they actually experience, it could also indicate that umpires do not experience as high levels of stress as was once thought or that umpires of different sports experience different levels or patterns of stress throughout a match. Alternatively, differences in calculating maximal heart rate could have resulted in contradictory findings (Helsen & Bultynck, 2004).

Irrespective of the cause of these inconsistent findings, even minimal exposure to acute stress may be harmful to umpire performance. While small amounts of anxiety may be beneficial for performance (Johansen & Haugen, 2013), acute stress can lead to decreases in attention, peripheral vision, speed of reaction times, concentration, motivation, effective decision-making and confidence in decisions (Andersen & Williams, 1999; Downward & Jones, 2007; Friman et al., 2004; Smith, 1986). Performance deficits which impact the match may result in increased player frustration and abuse from players, coaches and spectators. In turn, this could prompt increased stress for umpires, and lead to chronic stress and attrition. Therefore, even low levels of stress experienced by umpires during a match should be considered in future umpire research, as it can have detrimental effects on performance, retention, and potential for increased abuse received, especially in younger umpires (Friman et al., 2004).

Age and experience as moderators of stress and attrition. Simmons (2006) claims that there are particularly high turnover rates in young umpires, especially in the first year of training (Cuskelly et al., 2004). Many football referees are trained between the ages of 14

and 18 years, yet leave the sport soon after due to social changes such as leaving school, entering a serious relationship, or moving to a new city or country (Parsons & Bairner, 2015). Anecdotal evidence from local netball officials in New Zealand suggests that high rates of attrition in young umpires may be due to them leaving for university or lacking in confidence to continue on the role.

Research indicates that young umpires in particular are more likely to be subject to abuse, perhaps as they appear vulnerable or less experienced (Folkesson, Nyberg, Archer, & Norlander, 2002; Friman et al., 2004; Kaissidis & Anshel, 1993). Younger umpires umpiring junior grades could also be genuinely less experienced, have difficulty concentrating (Folkesson et al., 2002) and make more errors, which may lead to player frustration and abuse. In a study by Vamplew (1991), coaches expressed that umpire standards were often lower at junior levels, potentially leading to frustration. As discussed, this abuse from frustrations could lead to increased performance decrement, stress, burnout and drop-out. Walters (2011) noted that younger umpires seemed to be particularly affected by criticism from the sideline, which appeared to compromise their decision-making abilities and confidence. In a significant study which examined umpires who had already withdrawn from their sport, Forbes and Livingston (2013) suggested that abuse is the leading factor in drop-out for less experienced umpires while more experienced umpires are more likely to leave due to career demands. This may account for findings that abuse is not always the primary factor identified in drop-out, as most umpire research has been conducted with older, elite umpires (Dowrick, 2012b). However, Forbes and Livingston (2013) used a qualitative design and as such did not control for the age of the umpire when examining qualification levels.

In addition to younger umpires being exposed to higher rates of abuse and experiencing high rates of attrition, more qualified umpires tend to report more stress (Johansen & Haugen, 2013; Kilani et al., 2013). This may occur because they officiate at

matches for older, more vocal and more experienced players who are more likely to dispute a call from the umpire (Rainey, Santilli, & Fallon, 1992). In these games, results and performance can have significant consequences for players, teams and umpires themselves in terms of fixture results, match allocation and personal advancement (Dorsch, 2007; Goldsmith & Williams, 1992). Despite this heightened experience of stress, older or more experienced umpires are less likely to report burnout or intent to drop out than younger umpires with fewer than five years of experience (Kruger et al., 2012; VanYperen, 1998). Romeo (2013) suggests that this may be due to hormonal changes occurring in the brain during adolescence, resulting in an increased stress response. An increased stress response may contribute to stress-related performance deficits as well as an increased risk for burnout, which has been found to be more likely in younger umpires (Kruger et al., 2012; VanYperen, 1998). Therefore, while more qualified umpires report higher stress levels as they officiate at crucial matches, adolescent umpires may be more affected by stressful situations. In summary, both highly qualified umpires and adolescent umpires may be vulnerable to the effects of stress while umpiring, although adolescent umpires appear especially susceptible to burnout and drop-out.

Refficacy as a moderator of stress. *Refficacy* or referee self-efficacy refers to the level of confidence held by an umpire or referee in their abilities to perform the umpire role (Guillén & Feltz, 2011). The concept of refficacy includes skills in game knowledge, decision-making, psychological strength, strategy, communication, and fitness, as suggested by nine male referees from the United States (Guillén & Feltz, 2011). Guillén and Feltz (2011) hypothesised that umpires with higher levels of refficacy would also demonstrate superior decision-making skills, experience fewer rule violations during matches, greater fitness level, and receive more positive feedback from players, coaches and co-umpires.

Therefore, there may be potential for refficacy to moderate (or mediate) the relationship between the abuse of umpires and stress experienced.

Reducing umpire attrition and abuse. In order to address issues of abuse of umpires in relation to retention, it is imperative to understand the foundations of player, coach and spectator abuse. An extensive qualitative study by Simmons (2006) investigated the attitudes of three elite football referees and two senior sports officials in Australia towards abuse. Participants perceived that abuse from players and coaches stemmed from feelings of frustration or disappointment, and suggested that this frustration could be reduced through stimulating the confidence of players and others in umpiring decisions; promoting player understanding through the use of clear hand signals, a strong and loud whistle, and a calm and confident demeanour; and using discipline appropriate to the situation. To overcome the problem of abuse, Cunningham, Simmons, Mascarenhas, and Redhead (2015) suggested that umpires should present their umpiring decisions to multiple audiences such as players, coaches, spectators, and their co-umpire in a clear and convincing manner in order to convey the impression of fairness. This is in accord with findings from Chory-Assad and Paulsel (2004), whose research implied that when decisions are perceived to be in accordance with the rules and when rules are perceived to be consistently applied, aggression and hostility are less likely to occur. Earlier work by Scherer (1973) also indicated that using a louder voice can give audiences the impression that the speaker is more confident, regardless of content. Complementing these findings, a study by Kimble and Seidel (1991) with 101 participants suggested that the more confident a person is in the accuracy of their response, the more likely it is that their response will be louder. In addition to making accurate decisions, umpires must therefore convey confidence when communicating their decisions in order to be more favourably perceived and to minimise player, coach and spectator frustration.

Specifically, success in the umpire role requires game management skills. In a study examining the performance qualities of successful elite international umpires, McCarthy, McClintock, McCoy, and McCullagh (2005) found that game management, in addition to rule knowledge, was an important component of umpire performance. Game management was understood as the relational skills, both verbal and nonverbal, that permit the umpire to communicate with the players in an effective way. According to a panel of elite-level umpires, umpire coaches and coaches, effective nonverbal communication could be operationalised as using a sharp and loud whistle; making eye contact with the offending player and keeping them in view; being in close proximity to infringements; appearing calm and standing "strong"; using clear, timely hand signals which last several seconds and are visible to players and spectators; having a confident but non-aggressive control style; and taking time to restart play (Mellick, Fleming, Bull, & Laugharne, 2005). Effective verbal communication techniques included being concise and making obvious to the player what the infringement was and how to avoid further penalisation (Mellick et al., 2005).

In the sport of netball, guidelines for game management have been made available by the International Netball Federation, the governing board of netball (see Appendix A)**.** This game management document encourages the use of voice, change of tone, a more deliberate whistle and holding time to speak to a player to manage player behaviour. More serious behaviours could be managed through following discipline procedures to advance, warn, suspend or order off a player.

Young umpires, however, require training in order to acquire and apply such game management skills. In a study by Warner, Tingle, and Kellett (2013) elite referees expressed that training for managing difficult social interactions was necessary, but reported that training in game management skills was very rarely provided. Findings from a report from Cuskelly et al. (2004), which included 15 sporting organisations across five sporting codes,

indicated that umpire training focused on rule knowledge and application, while neglecting verbal and nonverbal communication skills, and conflict management. One exceptional organisation provided an after-hours helpline for umpires to discuss any conflict or abuse issues, and this appeared to be associated with improved umpire retention (Cuskelly et al., 2004). Without specific game management training, inexperienced umpires may require several years to learn game management skills commonly used at elite levels (e.g. Mellick et al., 2005). In the meantime, they may experience player frustration from lack of player confidence in the decisions of the umpire, and subsequent abuse and stress leading to drop-out. It is therefore imperative that young, developing umpires are taught effective game management skills in a timely way, in addition to successful application of the rules. This could be implemented in conjunction with any community or national campaigns condemning the abuse of umpires, such as the *Respect* campaign introduced by the Football Association in England (Parsons & Bairner, 2015).

In the literature there appears to be a lack of research on the training of sports officials especially beyond decision-making accuracy. Most studies in the area have focused on developing physical and psychological performance, in the place of game management and communication (Mascarenhas, Collins, & Mortimer, 2005). For example, online video training programmes have been used in an attempt to improve decision-making accuracy in soccer and basketball referees (Schweizer et al., 2013; Schweizer, Plessner, Kahlert, & Brand, 2011). These video training programmes offered immediate positive and negative feedback of the referees' decision-making accuracy. This is in contrast to interventions such as Feedforward video self-modelling (FF VSM) or Positive self-review video self-modelling (PSR VSM), which provide only positive footage of successful attempts and have not yet been assessed with umpires. In the netball literature, it appears that most of the research has focused on players (e.g. Cardiff & O'Donoghue, 2014; Devonport, Lane, & Biscomb, 2013;

McGrath & Ozanne-Smith, 1998) and there also appears to have been no research conducted on the training of netball umpires in game management or in any other umpiring skills.

Methodological issues in the umpiring literature. There are several strengths and limitations in the umpiring literature. One key limitation of the above research is that the population who could provide the most personal and accurate information around umpire attrition are those umpires who have already withdrawn. As individuals often do not maintain contact with their respective sporting organisations following drop-out, it can be very difficult to contact them for research purposes. Therefore, almost all relevant data has been collected from current umpires or former umpires who have remained in the sport. Remaining umpires may be qualitatively different from those who have withdrawn from the role. For example, they may be more motivated to umpire or less affected by abuse, and may cite different factors in stress, burnout and attrition. This may give a biased view of factors related to umpire attrition, as studies of umpire attrition often use a sample of umpires who have remained in the sport for an extended period of time.

Furthermore, many studies rely on a self-report measure of intention to continue or intention to withdraw, in the place of utilising longitudinal data of genuine attrition rates. The use of intention as a predictor of behaviour stems from Ajzen's (1991) theory of planned behaviour which suggests that intention is an appropriate predictor of behaviour. In one study of 420 volunteer volleyball umpires, self-report ratings of intention to drop out correctly classified 86% of the sample in terms of their actual *stay* or *leave* behaviour measured six months later (VanYperen, 1998). Therefore, while *intention to drop out* may suffice as an estimate of turnover in cross-sectional studies, longitudinal studies have the opportunity to measure actual rates of turnover. This would allow for more accurate estimates of the influence of variables such as abuse, stress and burnout on attrition and retention outcomes.

In terms of design, one important limitation of this area of literature was that most quantitative studies with umpires were cross-sectional. In such studies, the long-term consequences of abuse of umpires such as chronic stress or decreased motivation cannot be examined. Furthermore, it is not possible to establish the causes of umpire attrition, as these studies produced correlational data. One exception is Taylor et al. (1990), who used a longitudinal design to assess the relationships between stress, burnout and intention to drop out. This allowed researchers to draw conclusions about the directional influence of these factors.

In contrast, qualitative studies on umpiring have provided the umpiring literature with informative data. Studies such as Simmons (2006) have used extensive interviewing strategies and an exploratory approach to gain perspectives from umpires from a variety of sporting codes and qualification levels. In this area of little research, such qualitative studies have the potential to inform interventions which may benefit umpires and their respective organisations. There remains a lack of development of interventions for umpires or empirical support for any that may exist currently.

Sixty-four studies have focused on stress-management interventions for athletes, identified by Rumbold, Fletcher, and Daniels (2012). In contrast, an extensive search of the literature using the SportDiscus, PsycInfo and Google Scholar databases revealed that there has been no published empirical research conducted on interventions which focus on the reduction of umpire abuse, stress or attrition in any sporting code or with any population. There is a possibility that video self-modelling may be such an intervention. Video self-modelling involves individuals viewing video footage of themselves, which has been edited to show them successfully performing a behaviour that they could not previously perform, or could not perform in the setting, or at the frequency shown in the video (Dowrick, 1999). Umpires, who may struggle to react appropriately to abuse from players, coaches or

spectators in reality, can view themselves on video responding skilfully and successfully to several difficult scenarios. Video self-modelling therefore allows umpires to "learn from the future" (Dowrick, 2012a, p. 215) without being exposed to additional abuse in reality. The following section offers a review of the VSM literature.

Review of VSM Literature

Video self-modelling foundations and theory. Video self-modelling has its foundations in the work of Miller and Dollard (1941). Learning through watching others occurs frequently, however, Miller and Dollard's research represents the first published documentation of observational learning, or the ability of an individual to observe others' actions and to learn from them without explicit teaching. In the 1960's, Albert Bandura extended this research to explore the possibilities of observational learning using film, in work known as "the Bobo doll experiment" (Bandura, Ross, & Ross, 1963). In this study, young children watched film footage of adults either playing with or physically and verbally assaulting a blow-up doll (Bobo). Children were more likely to imitate the behaviour that they had witnessed on the tape when later playing with the doll, thus providing a powerful example of the effectiveness of observational learning from film footage.

Based on those findings, Bandura developed what is known today as social cognitive theory (Bandura, 1971). This theory proposes that learning can take place purely through observing a) other individuals who serve as models and b) the consequences they experience, without explicit teaching of novel behaviours, practice of those behaviours or direct reinforcement. Social cognitive theory also emphasises the importance of social context and the fact that learning can occur without the performance of the behaviour. Bandura (1973) proposed that certain characteristics of the model can enhance learning by observation, such as model warmth, power or similarity to the observer. It is suggested, for example, that the more similar the model is to the individual, the more likely it is that the latter will learn the

demonstrated behaviour. One could therefore predict that the most successful model for any individual would be him/herself and that self-modelling (observing oneself performing only adaptive behaviours) is simply a specific example of observational learning (Dowrick & Dove, 1980).

Indeed, Bandura (1997) suggested that observing oneself *successfully* demonstrating certain behaviours shows the individual how to effectively perform the skill. Bandura maintained that watching oneself successfully perform a behaviour increases one's self-efficacy, or belief that one can effectively perform this behaviour. His research supported the hypothesis that the higher the self-efficacy of an individual to perform a specific behaviour, the more likely he/she would be to perform that behaviour, and that mastery of the behaviour would in turn increase self-efficacy (Bandura, 1977). Since Bandura's work, many studies have examined the relationship between observational learning, self-efficacy and motivation, especially in self-modelling research (e.g. Schunk, 1989; Schunk & Hanson, 1985).

Early work by Dowrick connected the use of video in observational learning with the use of self-as-model to form what is now known as VSM. Video self-modelling uses only footage of the best performance of the individual (Dowrick, 1999), in audio, video or image form. In contrast, other interventions may use peer-modelling or self-observation. Peer-modelling involves viewing another person performing the target behaviour, either in person or through media such as video. Self-observation involves the viewing of one's performance of a skill without necessarily removing errors or hesitations, through video or other mediums. Although different to VSM, Zetou, Tzetzis, Vernadakis, and Kioumourtzoglou (2002) compared the effects of self-observation and expert-modelling interventions in a group of 116 school-age volleyball players. Results indicated that expert-modelling of excellent performance produced greater improvements than video self-observation of successful and failed attempts. Likewise, the use of VSM has been associated with prompt and significant

improvements, yet the specific mechanisms which enable such rapid learning are lacking development.

More recent theoretical developments contradict Bandura's initial view that self-modelling is a specific case of observational learning which takes place through increasing self-efficacy. Specifically, Dowrick (1999) claimed that observing oneself should be respected as a "learning mechanism in its own right" (p. 36) and proposed that all observational learning is a case of self-modelling. Specifically, when an individual observes a model perform a behaviour, they can recall what the model did. The model is then automatically transformed into a *self*-model, based on specific capabilities in the individual's repertoire. Expert models have potential to demonstrate behaviours of higher quality but are more different from the individual and require more effort from the individual to construct a self-model. Using edited video footage of a self-model of skills already in the individual's repertoire (FF VSM) means that an adaptive self-model has already been constructed for the individual to observe, and therefore may account for the rapid learning that occurs with FF VSM (Dowrick, 2012a).

In terms of processes, Dowrick (2012a) proposes that self-modelling allows individuals to undertake Mental Time Travel (MTT), permitting them to "learn from the future" instead of the past (p. 215). Mental Time Travel refers to the ability of humans and other primates to anticipate, plan and modify future events using the frontal cortex (Mahoney, Devonport, & Lane, 2008). Unlike non-primates, humans can foresee events which they have not experienced before, entering the future by recalling similar events from the past (Mahoney et al., 2008). Mental Time Travel, a form of visualisation, allows humans to imagine future events but does not ensure the performance of an adaptive response.

When encountering a difficult situation, individuals must select from a range of possible responses or a "cognitive response hierarchy" (Dowrick, 2012a, p. 224). Possible

responses can be understood as arrangements of component behaviours in the repertoire of the individual. A response must reach the top of the cognitive response hierarchy in order to be performed reliably. Dowrick (2012a) proposed that self-modelling can help to move adaptive responses to the top of the cognitive response hierarchy.

Neurological evidence has provided support for the value of self-modelling, through mirror neurons. Mirror neurons fire in the brain of an observer in the same pattern as in the brain of the model, or as though the observer was performing the behaviour themselves. Effective self-modelling appears to stimulate more rapid and accurate neuron firing in the brain of the observer (Mallett, Kawabata, Newcombe, Otero-Forero, & Jackson, 2007). Self-modelling may therefore promote adaptive behaviours to reach the top of the cognitive hierarchy and be reliably performed.

In summary, MTT permits humans to predict future events and to learn from the future. Self-modelling, which includes all observational learning, is a necessary addition to MTT for learning to occur. Observing oneself performing a target behaviour (whether imaginal or in vivo) then makes this response more likely to be triggered when again in a similar situation. Therefore, MTT and self-modelling are essential processes in observational learning. Feedforward VSM may be particularly successful as the self-model has been prepared for the individual in audio, video or image form.

The following section offers an overview of findings from studies using VSM.

Positive self-review and Feedforward VSM. A literature search was conducted through the PsycINFO database. Key search terms were “video” AND “self” AND “model”, AND “Dowrick”. This search generated 138 articles, which were searched for further relevant references. Due to the relatively recent development of the VSM literature, theses and dissertations were included in this review.

The first study to use the self-as-model with video technology was conducted by Creer and Miklich (1970). The case study involved a 10-year-old participant who demonstrated non-compliant behaviours. The participant was filmed practicing compliant behaviours. After the behavioural rehearsal of compliant behaviours was unsuccessful in reducing non-compliant behaviours, the participant was shown the unedited video footage of compliant behaviours. This resulted in a considerable decrease in the frequency of non-compliant behaviour. A group study and a case study which used unedited footage to improve social behaviours in institutionalised children showed similar results (Miklich, Chida, & Danker-Brown, 1977; Miklich & Creer, 1974).

Later studies used edited video footage (Dowrick & Raeburn, 1977; Hosford & Brown, 1976). Dowrick (1999) distinguished between two types of VSM, which are PSR and FF. Positive self-review VSM involves editing footage to remove errors and hesitations to show the best performance of the desired behaviour by the individual. This is particularly appropriate for increasing the frequency of behaviours that are currently low-frequency or mixed with undesired behaviours (Dowrick, 1999). Positive self-review VSM has been implemented in studies showing an improvement in classroom teaching techniques (Hosford & Brown, 1976), academic skills (Schunk & Hanson, 1989), parenting skills (Meharg & Lipsker, 1992), and sexual functioning (Hosford, 1980); the learning of employment skills (Batts, 1978; Dowrick & Hood, 1981; Hosford, 1980) and safety skills (Dowrick, 1986); decreases in symptoms of depression and anxiety (Dowrick & Jesdale, 1990; Kahn, 1990); and increases in attention span (Dowrick & Raeburn, 1977) and on-task behaviour (Clare, Jenson, Kehle, & Bray, 2000; Crutchfield, 2014; Davis, 1979; Dowrick, 1978, 1986; Greelis & Kazaoka, 1979; McCurdy & Shapiro, 1989; Possell, Kehle, McLoughlin, & Bray, 1999; Shear & Shapiro, 1994; Walker, 1992; Woltersdorf, 1992).

Alternatively, FF VSM involves editing footage of skills already in the repertoire of an individual in order to recombine the skills, show them being performed in a new setting, or remove external prompts. Feedforward VSM is used when an individual has not yet performed the behaviour without prompts or supports, or in that setting, or in combination with other skills (Dowrick, 1999). Feedforward VSM has been used extensively and with relative success in areas of selective mutism (Dowrick & Hood, 1978; Holmbeck & Lavigne, 1992; Kehle, Madaus, Baratta, & Bray, 1998; Kehle, Owen, & Cressy, 1990; Pigott & Gonzales, 1987), fear responses (Mulholland, 2015; Swney, 2013), stuttering (Bray & Kehle, 1998; Cream, O'Brian, Onslow, Packman, & Menzies, 2009; Daly, 1987), oral fluency (Andersson, Melin, Scott, & Lindberg, 1995; Decker & Buggey, 2014; Greenberg, Buggey, & Bond, 2002; Harasym, Langevin, & Kully, 2015; Hitchcock, Prater, & Dowrick, 2004; Robson, Blampied, & Walker, 2015), language skills (Andersson et al., 1995; Bolivar, 1993; Conklin, 2015; Haarman & Greelis, 1982), functional skills (Danna, 2015; Ohtake, Takeuchi, & Watanabe, 2014) and social skills (Bellini, Akullian, & Hopf, 2007; Dowrick, 1979; Dowrick, Kim-Rupnow, & Power, 2006; Macias, 2014; Williamson, Casey, Robertson, & Buggey, 2013).

One significant advantage offered by FF VSM is the trend for extremely rapid learning and magnitude of positive results in relation to the time spent by participants undertaking the intervention. For example, Dowrick and Raeburn (1995) conducted a study with a five-year-old girl with cerebral palsy who could not step over 1 cm obstacles after six months in physical therapy. However, after six 2-minute viewings of a VSM video, the participant could step over 6 cm obstacles, including kerbs. Such rapid learning could be explained by the use of the self as a model performing skills already in the repertoire of individual (Dowrick, 2012a).

VSM and sport. Video self-modelling has been extensively evaluated in areas of language and social functioning in populations who experience symptoms of selective mutism, autism spectrum disorder, and attention-deficit/hyperactivity disorder. The following section offers an overview of the few studies that have focused on motor skills in sporting activities. Table 1 below offers a summary of the relevant studies.

In one of the first studies in the sports literature to use short videos edited to show only positive footage of targeted behaviours (as opposed to role-play or unedited video feedback), Dowrick and Dove (1980) assessed the use of FF VSM to teach swimming skills to three young children with spina bifida. A single-case, multiple-baseline design was used to evaluate the FF VSM intervention for swimming performance, which was rated by two observers using a checklist for water confidence behaviours. Observer ratings indicated that swimming performance of the three participants improved by 25%, 25% and 15.38% respectively, between baseline and three viewings of the video. Similar results were found in two group design studies, one which assessed PSR VSM with 10 adult beginner swimmers using a swimming performance checklist (Starek & McCullagh, 1999) and one which assessed self-observation with novice beach volleyball players, although this was described as self-modelling by the authors (Zetou, Kourtesis, Getsiou, Michalopoulou, & Kioumourtzoglou, 2008).

Clark and Sté-Marie (2007) used an experimental design to compare PSR VSM and self-observation interventions with a control group for improving swimming performance. Participants were 33 children. Swimming performance was assessed using a behavioural checklist, and motivation to swim, intrinsic and extrinsic motivation, self-satisfaction and self-efficacy were assessed using self-report measures. The study found that the VSM group had significantly higher performance ratings, higher intrinsic motivation and higher self-satisfaction than the other two groups. In contrast to Bandura's hypothesis that self-efficacy

would be positively associated with watching oneself successfully performing a behaviour, the groups did not differ significantly on self-efficacy, although it was reported that the VSM intervention increased self-efficacy. This study highlighted the potential for using VSM over self-observation for developing performance in a sports setting.

Table 1

Studies Assessing VSM in Sport

Authors	Participants	Design	Intervention	Treatment Time	Dependent Variable	Outcome
Bradley (1993)	Male basketball players	Group	PSR VSM, negative video feedback	3 viewings (not specified)	Basketball free throws	Improved free throw accuracy
Clark & Sté-Marie (2007)	33 children	Randomised control trial	PSR VSM, video feedback, control video	6 minutes total over 6 sessions	Swimming strokes	Greater improvements in swimming skills for VSM than other groups
Creer & Miklich (1970)	Boy (10 years)	Case study	Video feedback	Not specified	Social skills	Improved appropriate social interaction
Dowrick & Dove (1980)	3 children, spina bifida	Single-case, multiple baseline	FF VSM	18-30 minutes total over 3 weeks	Swimming skills	Moderate gains in swimming skills
Dowrick (1997)	Female gymnast (14 years)	Case study	FF VSM	1.5 minutes total at one session	Landing performance	Improvement in landings in competition
Franks & Maile (1991)	Female powerlifter (24 years)	Single-case	FF VSM	2.5 minutes repeated (not specified) over 25 weeks	Powerlifting	26% gains in lifting
Hagin, Gonzales, & Groslambert (2015)	12 male sports science students (26.8 years)	Within-participants	PSR VSM, no intervention	Continuous loop while running	Running to exhaustion	Increased duration in running with no increases in heart rate compared to control
Holman (1991)	Adult beginner swimmers	Group	FF VSM, no intervention	Not specified	Swimming skills	Improved swimming skills
Law & Sté-Marie (2005)	12 female figure skaters (13.4 years)	Within-participants	PSR VSM, no intervention	3 minutes total over 3 weeks	Figure-skating	Similar improvements in both conditions

Table 1 cont.

Studies Assessing VSM in Sport

Authors	Participants	Design	Intervention	Treatment Time	Dependent Variable	Outcome
Melody (1990)	10 male and female basketball players	Pre- and post-test	PSR VSM	30 minutes total over 2 weeks	Basketball free throws	Improved free throw accuracy for 70% of players
Ram & McCullagh (2003)	5 intermediate volleyball players	Single-case, multiple baseline	PSR VSM	3-8 minutes total over 3-8 weeks	Volleyball serve	Inconclusive
Starek & McCullagh (1999)	10 adult beginner swimmers	Randomised control trial	PSR VSM, peer-modelling	6 minutes total over 2 sessions	Swimming skills	Greater improvements in swimming performance for VSM
Sté-Marie, Rymal, Vertes, & Martini (2011)	22 adolescent female gymnasts	Within-participants	FF VSM, no intervention	3 minutes total over 2 sessions	Beam performance at 4 competitions	Higher scores for competitions using VSM
Sté-Marie, Vertes, Rymal, & Martini (2011)	31 children	Within-participants	FF VSM, no intervention	9 viewings (not specified) over 6 days	Trampoline skills for 2 routines	Greater improvement for VSM routine than control routine
Templin & Vernacchia (1995)	5 male university basketball players	Single-case, multiple baseline	PSR VSM + music + relaxation	20 minutes total over 4 sessions	Goal accuracy	< 5% improvement in goal accuracy
Winfrey & Weeks (1993)	11 young female gymnasts	Group	PSR VSM, no intervention	Not specified	Balance beam performance	Improved beam performance

Several studies have examined the potential for VSM to enhance performance in competitive or elite sport. In a pioneering study using FF VSM in elite sport, Maile (1985) showed powerlifting trainees edited footage of themselves successfully lifting target weights (Franks & Maile, 1991). Results from one female participant of the multiple baseline study indicated that gains of up to 26% were made in six months, an improvement usually unheard of at elite levels (Franks & Maile, 1991). In a sample of five elite basketball players, PSR VSM accompanied by motivational music was also associated with enhanced game performance, as measured as percentage of successful goal attempts (Templin & Vernacchia, 1995). Results may have been accounted for by the motivation music however, and not the VSM intervention. More recently, PSR VSM has also been successful in enhancing aerobic velocity while running when compared to a control condition (Hagin, Gonzales, & Groslambert, 2015). In the counter-balanced, within-participants design, 12 male sports science students (mean age = 26.8 years) were recorded running on a treadmill while watching either a white screen or video footage of themselves running at the final level of the graded pre-test. In the VSM condition, participants had to match their stride to that of the video. Results indicated that participants lasted longer before exhaustion in the VSM condition and that there were no significant differences in heart rate between conditions. These findings suggested that VSM may be an appropriate intervention for improving performance without increased exertion (Hagin et al., 2015).

Recent work by Ste-Marie and colleagues has focused on assessing the use of FF VSM in young sporting adolescents. Rymal, Martini, and Sté-Marie (2010) conducted a qualitative study of the use of VSM with 10 competitive divers between the ages of 10 and 17 years. Each diver selected two different dives of comparable comfort and difficulty. For each diver, a VSM video was created for one of the two dives, with the other dive serving as a control. Participants viewed their own VSM video three times during the week as well as

immediately prior to performing the dives in a competitive setting. Qualitative data indicated that participants perceived the VSM intervention as useful and motivating, with almost 20% of statements made by participants about VSM concerning motivation. One limitation of this study was that behavioural ratings of performance were not obtained, providing no quantitative data on changes in diving performance. Rymal et al. (2010) also concluded from the findings that adopting a self-regulation framework may provide insight into the processes of VSM, contrary to later studies.

Sté-Marie, Rymal, Vertes, and Martini (2011) continued this work with 22 competitive adolescent gymnasts, focussing on enhancing beam performance with a self-regulation framework. The study used a within-participants, counter-balanced ABAB design, comparing the effects of FF VSM with no intervention at four beam competitions. Participants watched VSM videos of a pre-selected beam routine at either the first and third, or second and fourth competitions, with the complementary competitions serving as controls. Judges' scores from the competitions constituted performance measures. In addition, self-efficacy was measured through a self-report questionnaire. Results indicated that the use of VSM before competition performance was associated with higher competition scores, but not with the self-report ratings of self-efficacy. These researchers drew tentative conclusions from the qualitative data that a self-regulation framework may still be appropriate for understanding VSM processes, despite poor coherence between theoretical predictions and results from the study. Furthermore, these behavioural results were based on scores from a variety of judges across the four competitions.

A parallel study also used a within participants AB design with 31 young adolescents to assess FF VSM use for trampoline performance enhancement (Sté-Marie, Vertes, Rymal, & Martini, 2011). For each participant, two 5-skill trampoline routines at an appropriate level were specified. A FF VSM video was created for one routine; the other served as a

control. Participants were filmed performing both routines on different days. Results from the scoring of participant videos by two independent judges indicated that routines from the VSM condition were performed with fewer errors, resulting in enhanced performance, when compared to routines from the control condition. There were no significant differences in self-efficacy between conditions however, or evidence supporting the use of a self-regulation framework although participants rated the videos as positive and useful.

In contrast, some studies have not supported the use of VSM in sport (Law & Ste-Marie, 2005; Ram & McCullagh, 2003; Winfrey & Weeks, 1993). Results from a study of 11 intermediate gymnasts suggested that PSR VSM had no effect on sport confidence or performance ratings of beam performance in comparison to the control group (Winfrey & Weeks, 1993). This may be accounted for by the lack of updating of the videos used, so participants did not view themselves improving. The intervention did however improve the accuracy of self-ratings. A single-case multiple baseline study by Ram and McCullagh (2003) with five young adults had similar results, with inconclusive findings regarding PSR VSM effects on intermediate volleyball performance and self-efficacy, even with frequently updated videos of the target skill. Ram and McCullagh (2003) identified that the effects of PSR VSM could be better assessed by increasing the number of observation opportunities and measuring performance form as opposed to performance outcome. Furthermore, practice effects may have influenced performance data, as measurement of the target behaviour occurred two or five days apart. Participants did however report finding VSM useful and motivating. Law and Sté-Marie (2005) conducted a study assessing PSR VSM with 19 adolescent figure skaters. Results for performance, self-efficacy, anxiety and motivation were inconclusive. This study used a control group of only seven participants however, and the intervention group had both an intervention condition jump and a control condition jump.

Therefore the power of the study was greatly reduced and there was an increased probability of not finding a significant result when there was in fact one.

It has been suggested by Jennings, Reaburn, and Rynne (2013) that these contradictory results can be accounted for the age and skill level of the participant(s), the complexity of the skill, and whether the skill is continuous, serial or discrete. Firstly, studies which use discrete skills, such as above, seem to find no advantage to using VSM. Secondly, these studies also used PSR VSM, which utilises footage of individuals performing skills within their repertoire, while FF VSM uses footage of skills superior to their current level (Dowrick, 1999). FF VSM may therefore be more appropriate for enhancing skills as opposed to learning new skills. Thirdly, results appear less likely to support VSM when using a sample of intermediate or elite athletes, in contrast to studies using beginner or less experienced participants. VSM may still be useful for elite athletes, but most improvement may be seen with samples of less experienced participants.

Methodological issues in the VSM literature. Over 100 studies which used VSM were reviewed for this project. Only 13 clearly followed a group design and four of those were randomised control trials. Group designs with large sample sizes are typically preferred in health sciences, although valuable individual data is lost through obtaining the group average (Blampied, 2001; Morgan & Morgan, 2009). In the VSM literature, group designs have been beneficial in the attempt to compare VSM to video-feedback, video peer-modelling or treatments such as cognitive-behaviour therapy. However, only two of the 10 group studies with available participant information used more than 16 participants per group (see Cream et al., 2010; Magill-Evans, Harrison, Benzies, Gierl, & Kimak, 2007). The small sample sizes used in these studies mean that the power of these studies is reduced, and the likelihood of making a Type II error (of not obtaining a statistically significant result when there is an effect) is increased (Maxwell, 2004). Therefore, research which attempts to

compare VSM to other interventions using a group design should use a large sample in order to maximise the power of the study.

Most VSM studies used a single-case design, often with a multiple baseline. While typically overlooked in psychology research (Blampied, 1999, 2011), single-case designs permit the evaluation of individualised VSM interventions while preserving idiographic data obtained from each participant. Single-case designs also allow for the direct replication of findings within a single study (McReynolds & Thompson, 1986). Many VSM studies have included a multiple baseline across participant or behaviours, which has improved the internal validity of these studies and permitted changes in behaviours to be attributed to the introduction of the VSM intervention. Thus, valid conclusions could be drawn from quantitative studies using small numbers of participants (Blampied, 1999), common in the VSM literature.

One of the major limitations of the current VSM literature is the reliance on self-report data. While behaviours were measured using observational checklists, other factors such as motivation, self-satisfaction, self-efficacy and self-regulation have been assessed using self-report questionnaires. Results from may therefore be influenced by social desirability or response bias.

Lastly, there has been some confusion around whether a study uses VSM or self-observation, and the classification of VSM interventions as FF or PSR. For example, Zetou et al. (2008) describe one intervention as "self-modelling" when both successful performances and errors were shown to participants. This is self-observation as clarified by Dowrick (1999). These types of errors have then transferred to reviews of the VSM literature (e.g. Buggey & Ogle, 2012).

Current Study

Overall, research and anecdotal evidence indicates that the issue of umpire retention needs to be urgently addressed in order to reduce umpire attrition rates, abuse, stress, performance deficits and burnout. Targeting the game management skills of younger, less experienced umpires may aid the prevention and management of abuse of umpires and encourage umpire retention. However, no published research has investigated such an intervention.

The published literature provides support for the use of FF VSM in many areas, including enhancing targeted sport skills in adolescent populations. Therefore, FF VSM has potential to be utilised in the teaching of game management skills to umpires. No published research has evaluated the use of VSM with umpires in any context.

The current study aimed to quantitatively evaluate the effects of a VSM intervention in the teaching of game management skills to adolescent umpires, in order to better equip umpires to minimise and manage sideline abuse. The adolescent age group were selected as anecdotal evidence from the local netball centre indicated that many umpires drop out around the age of 18 years. The project also aimed to assess the effects of the VSM intervention on self-efficacy to umpire, motivation to umpire, satisfaction with game management skills, and self-efficacy to manage challenging match scenarios. Furthermore, the project aimed to qualitatively examine the social validity of VSM in this context and to explore why young people begin, continue and stop umpiring.

The following research questions were examined in this project:

i. Does the frequency at which game management skills of adolescent umpires are performed increase with a VSM intervention for game management skills?

ii. Do ratings of self-efficacy, motivation, or satisfaction of adolescent umpires increase with a VSM intervention for game management skills?

iii. Is VSM a socially valid intervention in this context?

iv. What factors are involved in umpire recruitment, retention, and attrition?

It was hypothesised that i) VSM would be successful in increasing the frequency of game management skills employed by umpires while presiding over a netball game; ii) the introduction of the VSM intervention would be associated with increases in self-report ratings of self-efficacy to umpire, intrinsic motivation to umpire, satisfaction with umpiring performance, and self-efficacy to manage challenging match situations; and iii) VSM would be a socially valid intervention in this context. Although the final research question was exploratory, it was hypothesised that iv) factors such as time commitments and sideline abuse would be factors in umpire attrition, while a love of netball would be a factor in umpire recruitment and retention.

Chapter 2: Method

Design

The project used a single-case experimental design with a multiple baseline across participants to assess behavioural change. Repeated measures of game management skills were taken over six weeks. The introduction of the VSM intervention was staggered across pairs of participants after a short period in baseline (naturally occurring conditions). Each participant served as their own control, permitting comparisons across time and participants. Weekly measures and visual inspection of behavioural data allowed for monitoring of the effects of the intervention (Horner & Baer, 1978).

The project used pre- and post-intervention self-report measures of self-efficacy to umpire, motivation to umpire, satisfaction with game management skills, and self-efficacy to manage challenging game scenarios. A semi-structured interview was included in order to explore the umpiring experiences and attitudes of participants.

Ethical Considerations

Ethical approval for this project was obtained from the Human Ethics Committee at the University of Canterbury, New Zealand (refer to HEC letter of approval in Appendix B). Following ethical approval, permission to access potential participants and to use the local netball centre facilities was gained from the Chair of the board of trustees and the umpire allocator of the local netball centre. After the recruitment phase (described below), the selected nine participants (and their parents, as the participants were under the age of 18 or still at school) were provided with information sheets, consent forms and assent forms. During this time, the researcher answered any questions and explained the procedures for the project. Informed assent and consent were obtained from all participants and their parents respectively. Cooperation was sought from the umpire coaches responsible for the umpires participating in the project. Finally, volunteers provided informed consent to be videoed for

illustrative purposes in the role-play of scripted scenarios only; no data was collected from their involvement. The trained observer, who assisted with the coding of video footage, signed a confidentiality agreement.

Participation was voluntary. All participants and volunteers were informed of their right to withdraw involvement in the study up to the point of data collation. Appendices C to O contain all of the information sheets, consent and assent forms, and the confidentiality agreement.

As a further consideration, the researcher declared a possible conflict of interest in relation to her role as an umpire coach at the local netball centre. During the netball season, the researcher continued to coach umpires at the netball centre for various skills. To avoid affecting the results of the project by influencing the behaviour of participants, the researcher did not coach umpires who were participating in the project.

Recruitment

The researcher recruited participants through the local netball centre prior to the commencement of the 2015 netball season. Eligible participants were those who were umpiring at the local netball centre in 2015; were available throughout the entire season (15 weeks of competition); had paid their fees to the netball centre; had obtained their Centre Theory qualification; were female; and were 14 to 18 years of age. These criteria were selected in order to control for potential effects of gender, age and qualification level.

An email containing details of the study was sent to 31 eligible participants from the netball centre email address. The first nine individuals who responded by providing informed assent and informed consent from their parents were selected for the study. One individual withdrew from the project for unknown reasons before data collection commenced.

Participants

The participants were eight female adolescent umpires from the local netball centre. The mean age was 15.38 years (*SD* = 1.41). As shown in Table 2 below, participants held theory qualifications ranging from Centre Theory to Zone Theory and practical qualifications ranging from Level 2 to Centre Badge, at the commencement of the project. Participants had umpired for an average of 4.50 years (*SD* = 1.20) and played for an average of 7.38 years (*SD* = 1.69*)*, and reportedly umpired for between one and three hours per week during the netball season.

Table 2

Demographic Information of Participants

Pseudonym	Age (Years)	Umpire Experience (Years)	Playing Experience (Years)	Coaching Experience (Years)	Hours Per Week Spent Umpiring	Umpiring Theory Level	Umpiring Practical Level
Amy	16	6	8	0	2	Centre	Centre
Grace	18	5	7	2	3	Zone	Centre
Claire	16	4	8	3	2	Centre	Level 2
Diana	14	3	6	0	1	Centre	Level 2
Courtney	14	3	6	0	3	Centre	Centre
Lily	14	4	5	0	2	Centre	Level 2
Megan	15	5	10	0	3	Centre	Centre
Shannon	16	6	9	1	1	Centre	Centre
Mean	15.38	4.50	7.38	0.75	2.13		
SD	1.41	1.20	1.69	1.16	0.83		

Note. Centre Theory = the first nationally-recognised theoretical umpiring award;
Zone Theory = the second nationally-recognised theoretical umpiring award;
Level 2 = the second level of practical umpiring recognised by the local netball centre;
Centre Practical = the first nationally-recognised practical umpiring award

Setting

The researcher filmed participants and volunteers at the local outdoor netball courts, which were situated in a public park. This location consisted of 34 netball courts which were

used to host approximately 300 netball games each Saturday during the 15-week netball season of round-robin play. Participants completed questionnaires and took part in a semi-structured interview in a quiet and private room inside the local netball centre.

Apparatus

A JVC GC-PX100BAG camcorder was used to obtain video footage of the participants and volunteers for the creation of the VSM videos. This was also used to obtain footage of participants umpiring weekly netball games, from the sideline of the netball court. The camcorder filmed in 1080i high definition and produced good quality audio. To edit the video footage for the VSM videos, iMovie 09 computer software was used on an Apple MacBook computer. Compact disks (CDs) were used to provide participants with the completed VSM videos. An Olympus WS-110 digital voice recorder was used to record the audio of the semi-structured interviews to allow for further clarification by the researcher as required.

Measures

The project used a behavioural measure of game management skills as well as self-report measures of self-efficacy to perform umpiring skills, motivation to umpire, satisfaction with game management skills, and self-efficacy to manage challenging game scenarios. Furthermore, the researcher administered a semi-structured interview at the conclusion of the intervention phase. Observed sideline abuse and corresponding participant responses were not measured as it was predicted that abuse would be low frequency, especially in the presence of a camcorder, and participants would therefore not have adequate opportunities to demonstrate their responses. All measures can be found in Appendices P - Z.

Demographic questionnaire. The researcher developed a short questionnaire to obtain demographic information and umpiring background information from participants (refer to Appendix P). The questionnaire consisted of questions regarding the name, age,

ethnicity, netball umpiring experience, netball playing experience, hours per week spent umpiring, attendance status at a pre-season workshop, and intention to continue umpiring, of each participant.

Game management skills checklist. Performance of game management skills was evaluated using a behavioural checklist (see Appendix R) based on two documents. The first document was the Centre Umpire Award practical assessment (see Appendix Q) which was the only nationally-recognised, introductory-level qualification for developing umpires in netball centres across New Zealand (Netball New Zealand, 2014). The Game Management section of the assessment was used. The second document consisted of an outline of game management strategies encouraged by the International Netball Federation (International Netball Federation, 2014). The researcher used relevant information from these two documents to create a) the behavioural checklist of game management skills and b) the operational definitions (refer to Appendix S), which were used for coding video footage of game management skills.

The behavioural checklist included categories of Whistle, Body, Hand Signals, Voice, Setting Penalties, Protocols, Stoppages and Discipline. The operational definitions for each category are described as follows:

1. Whistle: The whistle is loud and crisp. It is short at penalties, goals and centres passes, longer for intervals and stoppages, and louder for a serious infringement.
2. Body: The umpire stands up straight, with head up and shoulders back, facing the court.
3. Hand signals: Hand signals are correct for the infringement, strong and clear to players, for every penalty and advantage call made during the game, as well as intervals, re-starts, Centre Passes, injury and blood incidents.

4. Voice: Voice is loud and clear, with correct terminology when calling penalties, calling the Centre Pass, calling advantage, holding the play for safety, and setting penalties.
5. Setting penalties: Penalties are set quickly and clearly in the correct place (where infringement happened) with the penalised player standing beside and away from player taking the pass.
6. Protocols: Before the game, the umpire finds her co-umpire; checks the players, ball and court; finds a scorer and the pink card; and asks for the Captain and Primary Carer. The umpire walks across the court with the ball to start the game (if walking umpire). During the game, the umpire stops the match with a long whistle and hand in the air in the case of injuries, ball on court, blood, and intervals. The umpires meet in middle of court at the end of each quarter, remain together at intervals, and check the score.
7. Stoppages: The umpire stops game for ball on court, blood or a major injury, and restarts correctly.
8. Discipline: The umpire correctly and appropriately gives an informal or formal warning, advances a penalty, or suspends or orders off a player.

The researcher used the behavioural checklist to score 10-minute segments of video footage of participants umpiring their weekly netball games. For each specified game management skill on the checklist, the researcher and trained observer where required recorded a) the number of opportunities to perform the skill and b) the number of times the participant performed the skill. The proportion of opportunities taken to perform each skill was expressed as a percentage of game management skills performed by each participant in each 10-minute sample. This provided a weekly measure of game management skills for

each participant. The researcher could then evaluate changes in these skills over the six weeks and between baseline and intervention phases.

Independent observer training. The trained observer was an experienced umpire at the local netball centre and a peer of the researcher. The role of trained observer was to code 25% percentage of the 10-minute segments of video footage of the participants umpiring in order to obtain a measure of interrater reliability. During the training, the researcher explained the operational definitions for each of the behaviours coded and explained the behavioural checklist to be used. The observer was provided with copies of both documents. The researcher then asked the observer to watch a series of videos of various umpires and to code the behaviours as accurately as possible. This continued until the observer obtained 100% correct coding for a one-minute video. The entire training session was completed in one hour.

Self-efficacy measure. Based on the Referee Self-Efficacy Scale (REFS) (Myers, Feltz, Guillén, & Dithurbide, 2012), self-efficacy was assessed using a 13-item self-report questionnaire which can be found in Appendix T. For this project, the measure was adapted slightly to be specific to the sport of netball by changing “the game” to “netball”, and specifying “game personnel” to mean “timers, scorers”.

Four dimensions of umpire self-efficacy are conceptualised in the REFS: Game Knowledge, Decision Making, Pressure and Communication. These dimensions were respectively defined as the confidence the umpire has a) in his/her knowledge of his/her sport, b) to make decisions, c) to be uninfluenced by pressure, and d) to communicate effectively. For example, “I am confident that I understand the basic strategy of netball”. Items were rated on a 5-point Likert scale. Item scores were summed to provide total scores for each subscale and an overall total score. A score of 14 from a possible score of 15 for the GK subscale would indicate a high level of confidence in knowledge of the game.

The REFS was designed to measure self-efficacy in umpires of team sports at all competition levels, in the context of the positive association between higher self-efficacy in umpires and improved attention, decision-making and reaction times, as well as reduced stress and attrition (Guillén & Feltz, 2011). The conceptual development of the REFS was based on self-efficacy theory (Bandura, 1997), self-efficacy research in sport (Feltz, Short, & Sullivan, 2008) and a conceptual model of umpire self-efficacy developed by Guillén and Feltz (2011). Umpire self-efficacy was defined as "the extent to which the referee believes that he/she has the ability to successfully officiate a competition" (p. 739).

Several studies by Myers et al. (2012) provided reliability and validity data for the REFS using data from 1609 participants in 15 different sporting codes. Results from structural equation modelling, conducted with data from 512 referees from Spain and the United States, supported the use of a four factor solution. Results from nested model comparisons indicated that the REFS was appropriate for use across countries, competition levels, team gender and sporting codes, when over 78% of the measurement parameters were specified as invariant. Results from a third study also suggested that years of experience, physical and mental preparation, highest level of umpiring, and environmental comfort were predictive of several dimensions of the REFS. Several sources of self-efficacy were not predictive of any REFS factors however, and the study did not examine the predictive validity of the REFS in terms of umpire performance, stress or attrition. Furthermore. generalisability of findings was limited as all studies assessing the REFS have used samples with very few females (Myers et al., 2012).

This measure appears to have adequate discriminant, concurrent and predictive validity for use in this project and would benefit from wider usage to further assess its psychometric properties.

Motivation measure. An 18-item self-report questionnaire based on the revised Sport Motivation Scale (SMS-II) (Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013) was used to assess six types of motivation to umpire, including intrinsic regulation, integrated regulation, identified regulation, introjected regulation, external motivation and amotivated regulation (refer to Appendix U). The six types of motivation refer respectively to whether respondents engage in sport because a) it is interesting and enjoyable; b) it reflects their values; c) it helps personal development; d) it increases self-worth; or e) it is externally rewarding; or whether f) they no longer have a reason to engage sport (Pelletier et al., 2013). Respondents rated how well the 18 items corresponded to their view of why they practice their sport (umpiring), scored on a 7-point Likert scale ranging from *does not correspond at all* (1) to *corresponds exactly* (7).

Brière, Vallerand, Blais, and Pelletier (1995) originally developed a sports motivation scale in French, using exploratory and confirmatory factor analysis with two samples of over 500 university athletes, with a mean age of 18.4 years. This scale was translated to English and validated with more than 600 university athletes to form the Sport Motivation Scale (SMS) (Pelletier et al., 1995). Both the EMS and SMS consist of seven subscales and assess intrinsic motivation, extrinsic motivation and amotivation. Both scales demonstrate moderate to high internal consistency (a = 0.82 and 0.75 respectively) and moderate test-retest reliability (r = 0.69 and 0.70 respectively). The SMS has shown moderate concurrent validity for factors such as intention to continue and interpersonal coach behaviours, as well as discriminant validity between types of motivation (Pelletier et al., 1995).

Initial positive psychometric properties of the SMS were later disputed on the grounds that the scale did not adequately reflect the widely cited self-determination theory framework for motivation in sport, developed by Deci and Ryan (1985), and that some items and/or subscales should be removed to improve internal validity and reliability (Mallett et al., 2007).

In response, Pelletier et al. (2013) conducted an exploratory factor analysis using the original items and new items with a sample of 206 adult athletes. A six-factor solution with 18 items explained 71.75% of the overall variance, and a confirmatory factor analysis (n = 206) revealed good model fit, moderate internal consistency (a = 0.70), and concurrent validity with factors such as coach behaviours, life satisfaction and goal orientation (Pelletier et al., 2013).

Self-satisfaction measure. Satisfaction with game management skills was assessed with a single, self-developed item (refer to Appendix V). Participants were asked to rate "how satisfied you are with your game management skills in the game you most recently umpired" on a 10-point rating scale, ranging from *not satisfied* (1) to *very satisfied* (10). This was consistent with the approach adopted by Clark and Sté-Marie (2007) when assessing the satisfaction of 33 children with their swimming skills.

Managing challenging game scenarios. As a further measure of self-efficacy to perform specific game management skills, the researcher wrote three game scenarios (refer to Appendix W). The following scenarios described common yet challenging netball match situations.

1. You penalise Wing Defence for stepping. She turns to you and loudly says "I didn't step! She pushed me! It's not fair! She pushed me!" You instruct her to stand down and she swears at you.
2. You penalise Goal Keeper for obstruction. You hear the coach of her team yell "Not fair! Are you blind ref?!"
3. It is half-time. The captain from one team approaches you. She says "I just came to tell you that the Wing Attack from the other team keeps pushing my players and swearing at them."

Participants were asked to rate how confident they were that they could manage each of the scenarios on a 10-point rating scale, ranging from *not confident* (1) to *very confident* (10). Ratings were summed to provide a total score for each participant. A rating of nine or 10 for a scenario indicated a high level of self-efficacy for managing that situation, while a rating of one or two indicated a low level of self-efficacy. Participants were also asked to record their response to each situation, in order to gain an insight into the types of game management skills the participants would consider using.

As this measure was developed by the researcher, there is no reliability or validity data to support its use. Therefore, it was used as an additional, specific measure of self-efficacy to support the data gathered from the REFS (Myers, 2012).

Video diary. Participants were asked to record the date and number of viewings each time they watched their personal VSM video, using a video diary sheet created by the researcher (see Appendix X). This allowed the researcher to measure how frequently the videos were watched over the intervention period.

Qualitative data. Participants completed in a short semi-structured interview around attitudes towards umpiring including questions such as "Why did you begin umpiring?", "What makes you want to continue umpiring?" and "What would make you quit umpiring?" (see Appendix Y). This qualitative data was gathered in order to gain the perspective of the participants and to explore themes around the recruitment, retention, attrition and abuse of young umpires. All interviews were conducted by the researcher in a private room at the local netball centre and were audio recorded for accurate data collection. There was no interview transcript.

Social validity. Social validity was assessed during the final semi-structured interview. The researcher asked questions such as "Did you find the video useful or not useful?" and "Do you think you would use a similar video again? If so, what types of skills

would you use it for?" (see Appendix Z). The interview was audio recorded to ensure accurate data collection.

Video-Making for VSM Videos

Generating match footage. Following the return of volunteer consent forms, 10 volunteers were invited to be filmed in order to generate footage of difficult match scenarios. The volunteers were peers of the researcher who were already involved in netball. The researcher prepared scripts for seven scenarios of a netball game. Scenarios included the following:

1. a player setting a penalty incorrectly,
2. a coach yelling from the side line,
3. a captain approaching the umpire to complain during the half-time,
4. a player disputing a call from the umpire,
5. a player throwing the ball away in response to a call,
6. a player involved in a serious infringement, and
7. a spectator yelling abuse from the stands.

The 10 volunteers were asked to role-play as netball players, a coach and a spectator as though a netball match was in progress and they were speaking to the officiating umpire. However, there was no actual match in progress or umpire present at this time. The researcher shot several short clips of each scenario, either using close-up shots or from the position that an umpire would usually occupy during a netball match. This meant that when each participant watched their edited VSM video later, it would seem that several players, a coach and a spectator were speaking directly to her when she was occupying an umpire role.

Generating participant footage. Participants were asked to spend approximately 30 minutes with the researcher at the local netball courts in order to generate footage of game management skills. The researcher demonstrated skills such as a clear whistle, a loud voice,

obvious hand signals, advancing a penalty correctly and penalising a player. These umpiring skills were demonstrated out of context and out of sequence to minimise the researcher's modelling of the behaviour. Participants were then filmed performing these skills using several short close-up shots for each skill. Skills were filmed in a specific order to minimise repositioning of the participant, tripod and camcorder.

Video editing. During the editing process, the researcher edited together the footage of each participant demonstrating game management skills and the footage of difficult match scenarios. The final edited VSM videos showed each participant successfully managing the seven difficult match scenarios appropriately while using skills such as a clear whistle, a loud voice and obvious hand signals. At the end of the editing process, each participant had a personal video approximately three minutes in length containing their own responses to each scenario.

Each video began with a title which included the name of the participant. The title was followed by three opening shots of a netball hoop, a netball game in progress and a "Positive Sideline Support" sign, and then a title "Start of the game". A shot of players on court, ready for the start of a match, was then followed by a shot of the participant blowing the whistle for the commencement of the match. The remainder of the video consisted of the seven match scenarios generated by the volunteers, interspersed by participant responses, and linked by shots of successful goals and centre passes. For example, the first scenario showed the participant penalising the Goal Keeper for obstruction. In the next shot, the Goal Keeper yelled to her team mate, which was followed by a shot of the participant blowing her whistle and reminding the Goal Keeper that she was "out of play". The scenario ended with a successful attempt at goal. The video was structured to include the participant blowing her whistle for the start and end of each quarter, with titles to indicate the passing of each quarter of the game.

The video concluded with a close-up shot of the participant making a positive statement about the match, such as "The game today was challenging at times but I thought I managed it really well." The final shot was a title "Thanks for watching". Throughout the video, background noise of other netball matches could be heard. This was consistent with the environment in which the participants would umpire naturally. Some audio from the volunteer footage, such as clapping and cheering, was added to enhance the experience of the video.

Procedures

Pre-intervention. On the third week of the 2015 netball season after a game management workshop run by the netball centre, participants completed the pre-intervention self-report measures of self-efficacy, motivation to umpire, satisfaction with game management skills, and self-efficacy to manage three written scenarios of challenging game scenarios. This occurred in a quiet and private room inside the local netball centre and lasted approximately 30 minutes.

On the same day and after completing the questionnaires, six of the participants were filmed umpiring their assigned Saturday match for 10 minutes for baseline behavioural measures. Baseline filming occurred the following week for Megan and Shannon due to their unavailability in the first week of the project.

Throughout the week following baseline measurement, participants were filmed performing specified game management skills to generate footage for their edited VSM videos, as described in the Video-making section above. A return to baseline after filming the footage was not possible for all participants given the time constraints of a 15-week netball season and ethical considerations regarding keeping participants in baseline for longer than necessary. Specifically, after participants were filmed for the VSM videos, Amy and Lily did not return to baseline before commencing intervention. Grace and Claire remained

in baseline for two weeks before intervention and Diana, Courtney, Megan and Shannon remained in baseline for three weeks before intervention.

Intervention. The intervention was introduced from the fourth week of the netball season (Week 2 of the project), with a delay in introduction of the intervention across pairs of participants. On the Monday following Week 2, participants Amy and Lily were provided with their personal edited VSM videos on a CD. They were asked to watch their videos several times each week until the end of the project and to record how many times they watched their videos on a video diary recording sheet provided. All other participants remained in baseline which consisted of their usual Saturday umpiring routines. On the Sunday following Week 3 of the project, Grace and Claire began intervention, followed by Diana and Courtney after Week 4. Megan and Shannon entered intervention last at Week 5 of the project. Participants remained in intervention until all participants had been in the intervention condition for at least two weeks (Week 7 of the project).

Weekly measures. After initial baseline measurement, weekly behavioural measures were taken to monitor the performance of game management skills for each participant. Participants were filmed each week for a sample of their match. The researcher filmed either the first (56%), second (29%), third (13%) or fourth quarter (2%) of their match. The researcher, and trained observer where required, coded this footage according to the behavioural checklist. This footage was not used for video editing. The researcher completed the weekly behavioural measures before delivering the VSM intervention to the two participants scheduled to enter intervention that week. This ensured that participants still in baseline had no opportunity to watch their video before the behavioural measure for that week was completed.

Post intervention. Participants were asked to return their video diary recording sheets to the researcher on the final Saturday of the project. On this day, participants were

again filmed for 10 minutes while they umpired a match, as a final behavioural measure. Participants completed measures of self-efficacy, motivation, self-satisfaction and self-efficacy to manage challenging game scenarios. Participants also took part in a semi-structured interview about their experiences of and attitudes towards umpiring, in the context of umpire recruitment, retention, attrition, and abuse. This occurred in a quiet and private room at the local netball centre.

Interobserver agreement. Independently, the researcher coded 47 (100%) ten-minute segments of the video footage and the trained observer coded 12 segments (25.53%). Interobserver agreement (IOA) was calculated on a segment-by segment basis using total count IOA by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying by 100. Agreement for percentage of game management skills performed ranged from 49.3% to 99.1%. The mean IOA for 99.1% for Whistle ratings, 90.7% for Body ratings, 79.7% for Hand Signals ratings, 49.3% for Voice ratings, 81.8% for Setting Penalties ratings, and 77.7% for Protocols ratings. There was not adequate data for Stoppages or Discipline ratings to calculate IOA.

Based on Miller's (1997) recommendation of 80% IOA for new variables (cited in Cooper, Heron, & Heward, 2007), IOA was adequate for Whistle, Body and Setting Penalties ratings. Protocols and Hand Signals ratings almost achieved adequate IOA. Interobserver agreement was low for Voice ratings and will be discussed in the final chapter.

Data analysis. Behavioural data consisted of footage of 10-minute segments of participants umpiring each week. The target observed game management behaviours included Whistle, Hand Signals, Voice, Body, Setting Penalties, Protocols, Stoppages and Discipline. Each 10-minute segment of video footage was coded according to the behavioural checklist developed by the researcher. The percentages acquired from the checklist provided a baseline measure of each game management skill for each participant.

A visual analysis of changes in level, trend and variability of the behavioural data of eight participants was conducted for game management skills, as is appropriate for a single-case design (Blampied, 1999). Level refers to the mean score within a phase, trend refers to increases or decreases in the slope of the line-of-best fit within a phase, and variability refers to the extent that the data fluctuates within a phase. Group behavioural data for game management skills as a whole was plotted across time on a multiple baseline figure and was then examined. Specific game management skills data for each participant was also plotted on individual figures and examined. Brinley-Blampied plots (Blampied, 2007, 2014; Brinley, 1965) were also used to assess changes in specific game management skills from baseline to intervention. Visual analysis of the plots was conducted to identify any effects over time for individual participants.

Percentage Non-overlapping Data (PND) was calculated to assess the effectiveness of the VSM intervention. Percentage Non-overlapping Data was calculated by dividing the total number of data points in the intervention phase that did not overlap with any points in the baseline phase by the total number of data points in the intervention phase (number non-overlapping/total data points x 100) (Gast, 2010). The averaged data from Whistle, Body, Hand Signal, Voice and Setting Penalties ratings was used to calculate PND for overall game management skills for each participant. Bellini, Peters, Benner, and Hopf (2007) specified that scores above 70% and 90% represented *effective* and *very effective* interventions, respectively.

Self-report data of pre- and post-intervention ratings of self-efficacy to umpire, motivation, satisfaction with game-management skills and self-efficacy to manage difficult match scenarios were plotted on figures. These figures were then examined for differences between pre- and post-intervention self-report ratings for each participant.

Data collected from the semi-structured interviews was examined for common themes and relevant individual statements relating to recruitment, retention, attrition and abuse of umpires.

Quantitative and qualitative data are discussed in the following section.

Chapter 3: Results

Quantitative results and qualitative results are presented in the following section. Behavioural data of the group is presented first, followed by individual figures for the behavioural data of each participant. All self-report data is then presented, including data for self-efficacy, satisfaction with game management skills, motivation to umpire and self-efficacy to manage to challenging game scenarios. Finally, qualitative data from the semi-structured interviews is presented.

Behavioural Data

Behavioural data consisted of ratings of game management skills, generated from coded segments of video footage of participants umpiring. Successful observed performances were expressed as a percentage of total observed opportunities to perform each behaviour, as identified from the 10-minute video segments. Ratings were plotted over the six-week time period for each participant. In Figures 1-9, data for Protocols, Stoppages and Discipline categories of game management skills are not shown as there were few opportunities for participants to perform in these categories. There is missing data (16.07%) from Figures 1-9, indicating participant absence on that day due to illness, injury or family commitments. As only one behavioural measure was able to be obtained during baseline for Amy and Lily and during intervention for Shannon, it was not possible to analyse changes in variability or trend for these participants.

Group behavioural data. Group behavioural data consisted of behavioural ratings of skills of Whistle, Body, Hand Signals, Voice and Setting Penalties, which were averaged to provide an overall rating of game management skills for each participant, and are presented in Figure 1 below.

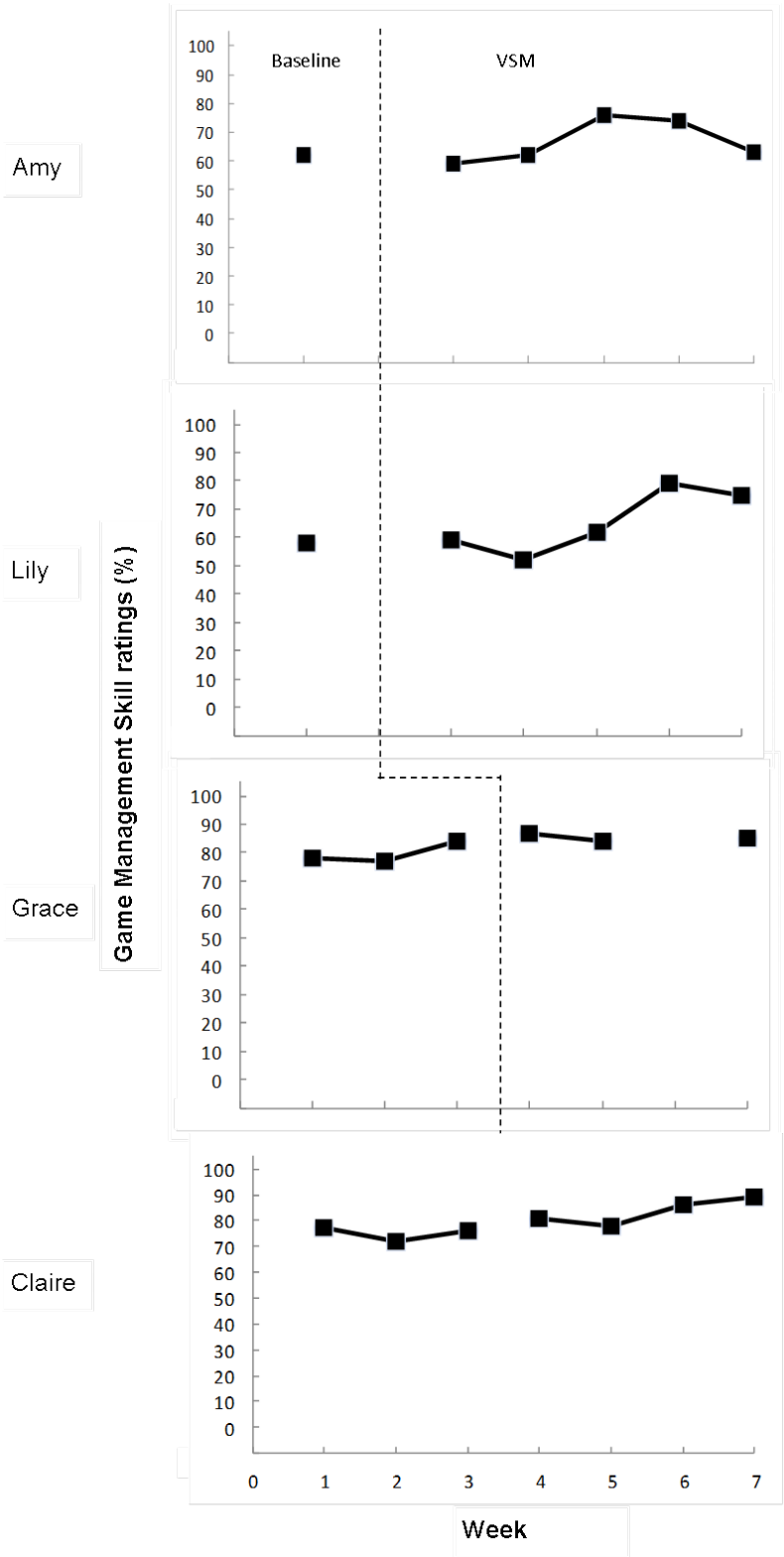


Figure 1: Percentage observed game management skills for each participant across baseline and intervention phases.

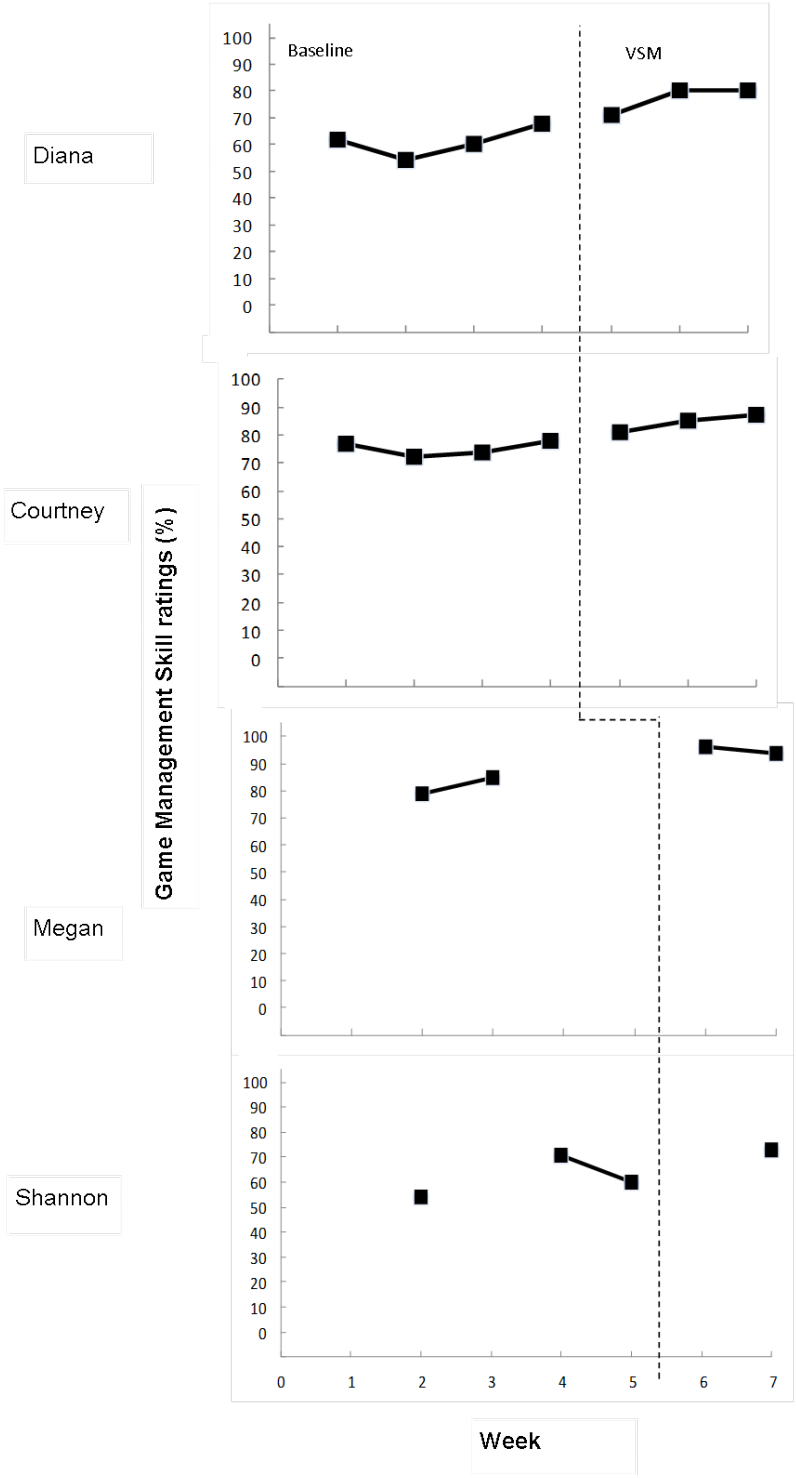


Figure 1 cont. Percentage observed game management skills for each participant across baseline and intervention phases.

Participants watched their videos 2.72 times per week on average according to their video diary recording sheets. On average, the level of game management skills ratings of the eight participants increased by 9.38 percentage points between baseline and intervention phases. Ratings for Diana increased the most in level (15.83 percentage points) while Amy's ratings increased the least (5.39 percentage points). For all participants with more than one measure in baseline, skill ratings had a slightly increasing trend throughout the baseline phase. All participants with more than one measure in intervention maintained an increasing trend in skill ratings in the intervention phase. This indicated a steady rate of learning throughout baseline and intervention phases. The only exception was Grace, whose behavioural ratings changed from a slightly increasing trend during baseline to a weak decreasing trend during intervention. Megan also had a slightly decreasing trend in the intervention phase, although there was insufficient data to draw any conclusions. Variability in game management skills data changed little in baseline or intervention.

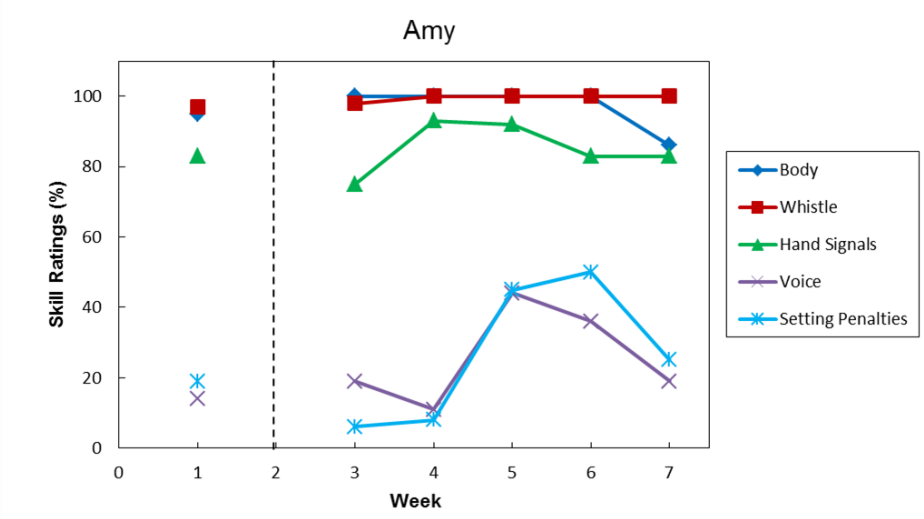
Diana, Courtney, Lily and Megan reported attending a game management workshop run by the local netball centre prior to the commencement of the project. All four participants reported that the workshop was useful. However, there did not appear to be systematic differences in their behavioural results compared to those of participants who did not attend the workshop.

While each match presented a different number of opportunities to perform the observed skills, overall there were no systematic differences between participants in terms of the number of opportunities for each skill. On average across all matches, each match presented 30 Whistle opportunities, 20 Body opportunities, 32 Hand Signals opportunities, 24 Voice opportunities, and 16 Setting Penalties opportunities.

Individual behavioural data. In addition to examining the overall game management skills data of each participant for changes between the baseline and intervention

phases, behavioural ratings of Whistle, Body, Hand Signals, Voice, and Setting Penalties were examined separately for each participant. Data is presented in Figures 2-9 below. The tables below each figure indicate the number of times that each participant reported watching her VSM video each week.

Amy. Figure 2 below indicates Amy's behavioural ratings for the five behaviours included for analysis. Amy commenced the VSM intervention after the second week of the project. She reported watching her video nine times over five weeks, at a rate of 1.8 times per week. Amy watched her video only three times in the final three weeks of intervention.



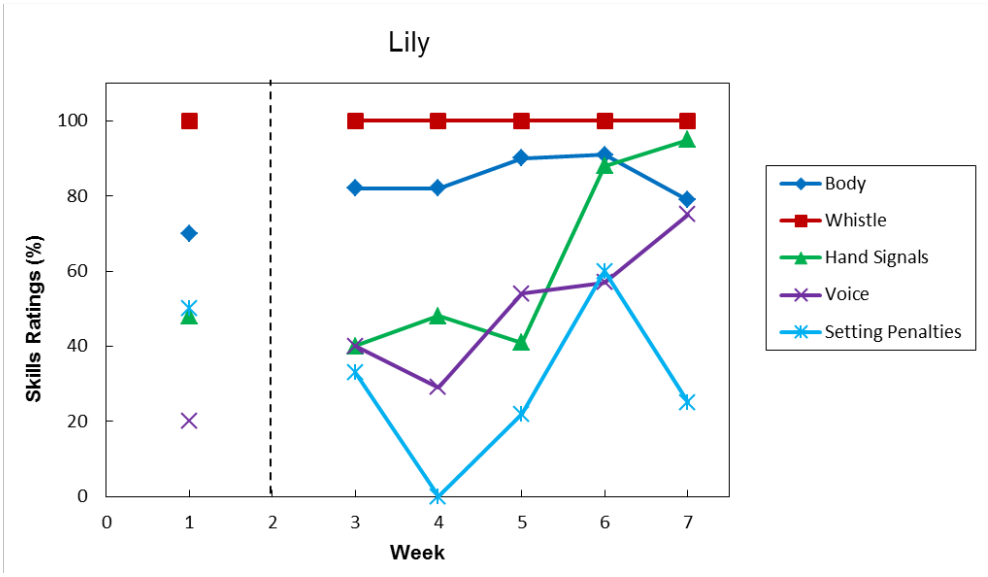
Week	2	3	4	5	6	7
Viewing frequency		4	2	1	1	1

Figure 2. Whistle, Body, Hand Signals, Voice and Setting Penalties ratings for Amy.

Following the introduction of the intervention, there were increases of 1 and 5 percentage points respectively in the level of Whistle and Body ratings, which remained above 98 percentage points with little variability throughout the intervention period until Body ratings decreased to 86 percentage points at Week 7. These high and stable levels of Whistle and Body ratings were typical of all eight participants. Hand Signals ratings increased in level from 75 to 93 percentage points after four reported video viewings,

increasing by 2 percentage points in overall level from baseline to intervention. Voice ratings increased in level from 11 percentage points in Week 4 to 44 percentage points in Week 5 after six video viewings in the intervention phase, with an overall increase in level of 12 percentage points from baseline to intervention. Setting Penalties ratings showed a large increase in level after six video viewings, from 8 percentage points at Week 4 to 45 percentage points at Week 5. There was an overall increasing trend during intervention for all observed behaviours. The intervention-phase data for both Voice and Setting Penalties had high amounts of variability. Decreases in Body, Hand Signals, Voice and Setting Penalties ratings by Week 7 indicated that initial improvements made from baseline to intervention were not maintained.

Lily. Lily entered intervention after Week 2 of the project. Lily reportedly viewed her video nine times over five weeks of the intervention phase, at a rate of 1.8 times per week. However, Lily reported that she only watched her video twice in the final two weeks of intervention. Behavioural data for Lily is presented in Figure 3.

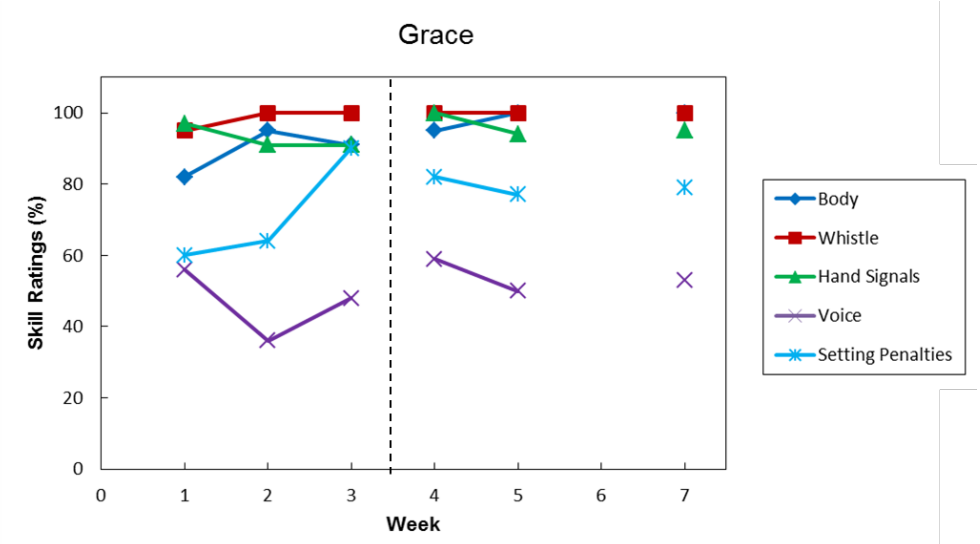


Week	2	3	4	5	6	7
Viewing frequency		3	2	2	1	1

Figure 3. Whistle, Body, Hand Signals, Voice and Setting Penalties ratings for Lily.

There was a moderate amount of variability in Hand Signals, Voice and Setting Penalties data from Lily. Whistle ratings remained at 100 percentage points throughout baseline and intervention. There was an increase in level of Body ratings from 70 percentage points at baseline to 85 percentage points during the intervention phase, and an overall weak increasing trend. Hand Signals ratings increased in level from 48 to 63 percentage points from baseline to intervention, reaching 95 percentage points at Week 7 with a strong, increasing trend. Lily's Voice ratings showed an overall increase in level of 31 percentage points from baseline to intervention, with a change from a decreasing trend to an increasing trend after five VSM video viewings. The high level variability of the Setting Penalties data made it difficult to determine any trends although there was an overall decrease in level from 50 to 28 percentage points from baseline to intervention. Similar to Amy's ratings, Lily's ratings for Body and Setting Penalties decreased at Week 7, indicating that any large increases were not maintained.

Grace. Grace entered intervention after Week 3 of the project. She reported watching the 11 times over four weeks of intervention, at a rate of 2.75 times per week. Five of the 11 viewings occurred in the final week of the intervention phase. Figure 4 below shows Grace's behaviour ratings.

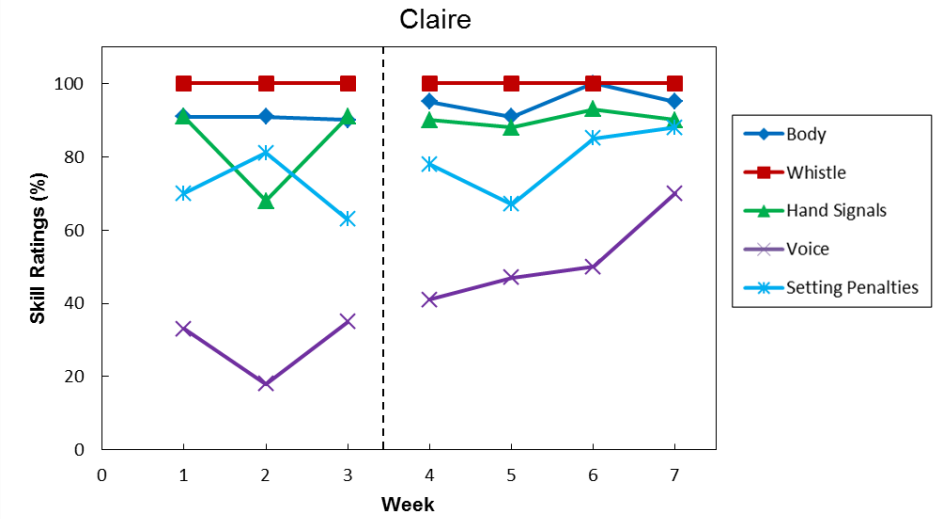


Week	2	3	4	5	6	7
Viewing frequency			3	2	1	5

Figure 4. Whistle, Body, Hand Signals, Voice and Setting Penalties ratings for Grace.

Grace's Whistle ratings increased from 98 percentage points at baseline to 100 percentage points during intervention, with a stable trend as ratings reached 100. Body ratings also increased in level by 3 percentage points from baseline, with an increasing trend becoming stable ratings reached 100 percentage points. Hand Signals ratings increased 3 percentage points in level from baseline to intervention, with no changes in variability or trend. Voice ratings increased in level from 46 percentage points at baseline to 54 percentage points in the intervention phase, and the decreasing trend became weaker. Variability in Voice ratings decreased slightly in the intervention phase. Grace's Setting Penalties ratings increased by 8 percentage points across phases, although a moderate increasing trend in baseline changed to a small decreasing trend in intervention.

Claire. Claire entered intervention after Week 3 of the project. She reported viewing her video 19 times over four weeks of intervention ($M = 4.75$ times per week), far more frequently than any other participant. Figure 5 below shows Claire's behavioural ratings.



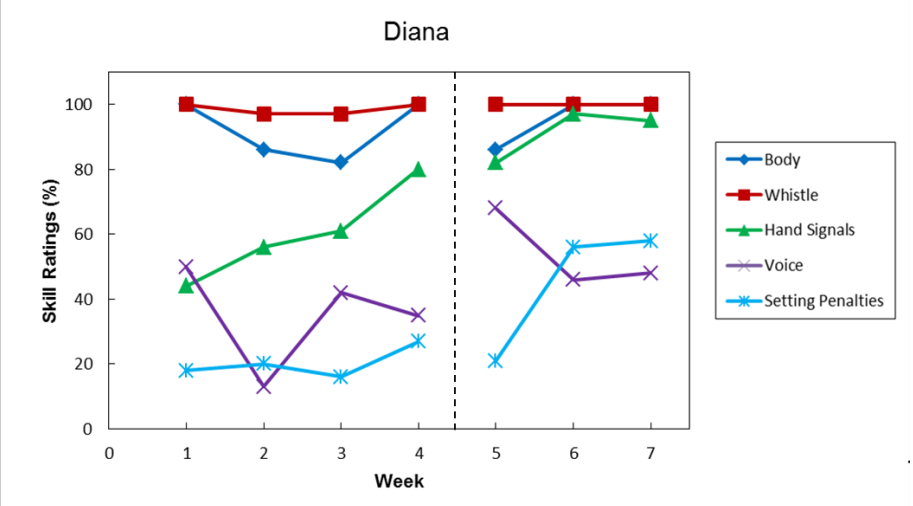
Week	2	3	4	5	6	7
Viewing frequency			5	4	5	5

Figure 5. Whistle, Body, Hand Signals, Voice and Setting Penalties ratings for Claire.

Claire's Whistle ratings remained at 100 percentage points throughout baseline and intervention phases. Body ratings for Claire increased slightly in level from 91 percentage points at baseline to 95 percentage points during intervention, as a stable baseline trend changed to a slightly increasing trend during intervention. Claire's Hand Signals ratings increased slightly in overall level from 83 percentage points at baseline to 90 percentage points in the intervention phase. A slightly decreasing trend for Hand Signals ratings became stable during the intervention phase, with a decrease in variability. From baseline, Voice ratings increased by 23 percentage points in level. A weak decreasing trend for Voice ratings changed to a moderately increasing trend during the intervention phase. Ratings for Setting Penalties increased in level by 8 percentage points compared with baseline, with a

change from a weak decreasing trend in baseline to a weak increasing trend in intervention, and a moderate amount of variability in the Setting Penalties data.

Diana. Diana entered intervention after Week 4 of the project. She reported watching her video six times over three weeks, an average of two times each week. Four of the six viewings occurred in the final week of intervention. Figure 6 below shows the behavioural data for Diana.



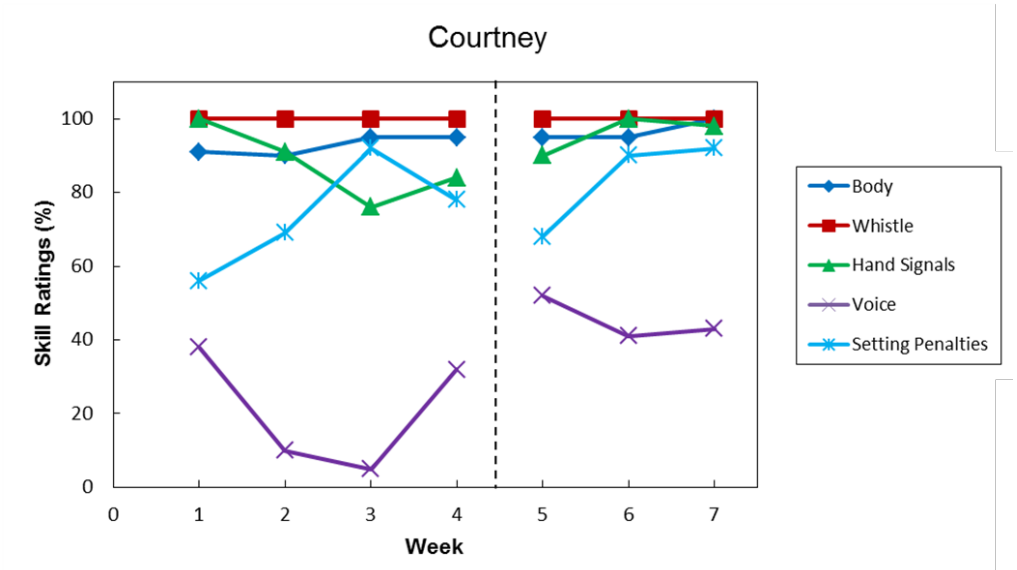
Week	2	3	4	5	6	7
Viewing frequency				2	1	3

Figure 6. Whistle, Body, Hand Signals, Voice and Setting Penalties ratings for Diana.

Whistle and Body ratings for Diana were similar to those of other participants. Diana's Hand Signals ratings showed a moderate increasing trend with little variability throughout baseline and intervention phases, resulting in an overall increase of 31 percentage points from baseline to intervention. Voice ratings for Diana increased from 35 percentage points at baseline to 54 percentage points during intervention, with an increase of 33 percentage points immediately after the introduction of the intervention. There was moderate variability and a weak decreasing trend in Voice data in both phases. Setting Penalties ratings increased to 45 percentage points in intervention from 20 percentage points at

baseline. There was a change from a small increasing trend in the baseline phase to a moderate increasing trend in intervention in Setting Penalties data.

Courtney. Courtney entered intervention after Week 4 of the project. She reported watching her video five times over three weeks of intervention, at a rate of 1.67 viewings per week. This was the lowest rate of reported viewings of all eight participants. Behavioural data for Courtney is presented in Figure 7 below.



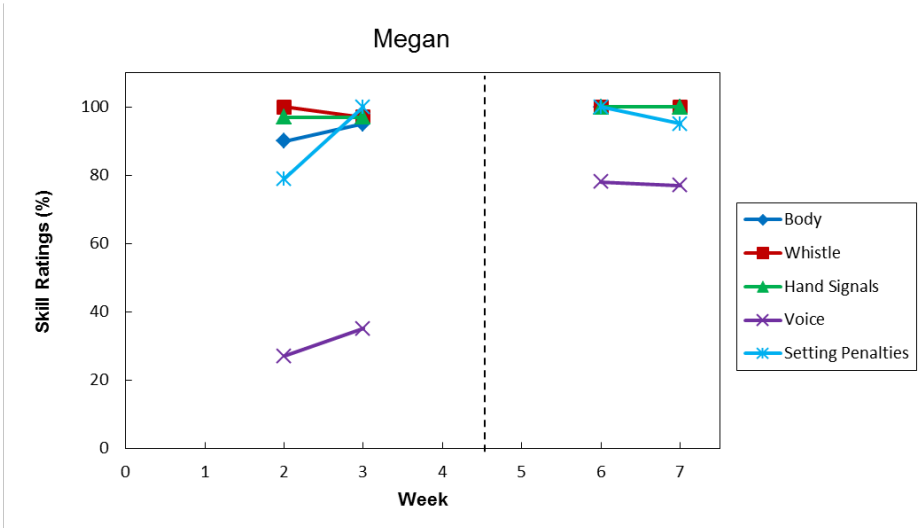
Week	2	3	4	5	6	7
Viewing frequency				2	1	2

Figure 7. Whistle, Body, Hand Signals, Voice and Setting Penalties ratings for Courtney.

Courtney's Body ratings increased slightly from 93 percentage points at baseline to 97 percentage points during intervention, with a slight increasing trend throughout. Hand Signals ratings had moderate variability in the baseline phase, with a small decreasing trend. This changed to an increasing trend with less variability during the intervention phase. The overall change in level of Hand Signals ratings was an increase of 8 percentage points, although the highest rating of 100 percentage points at Week 1 was not attained in later weeks. Courtney's Voice ratings had moderate variability at baseline which decreased in intervention. Voice ratings had a weak decreasing trend in both baseline and intervention

phases, with moderate variability. There was an overall level increase of 24 percentage points in Voice ratings, peaking at 52 percentage points immediately after the introduction of the VSM intervention. Setting Penalties ratings increased in overall level from 73 to 83 percentage points from baseline to intervention, with moderate amounts of variability and an increasing trend in both phases.

Megan and Shannon. Megan and Shannon both entered the intervention phase after Week 5 of the project. Due to multiple absences from both participants, there was not adequate data to analyse changes in level, trend or variability of data between the baseline and intervention phases. Behavioural data for Megan and Shannon is presented below in Figures 8 and 9 and will be considered as pre- and post-intervention results.

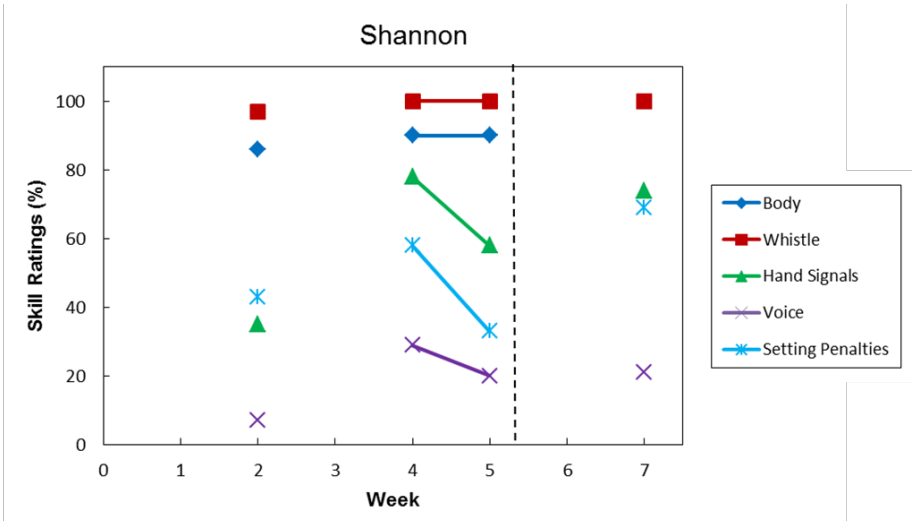


Week	2	3	4	5	6	7
Viewing frequency					7	0

Figure 8. Whistle, Body, Hand Signals, Voice and Setting Penalties ratings for Megan.

Megan reported watching her video seven times, all within the last week of her intervention phase. For Megan, ratings for Whistle, Body, and Hand Signals increased slightly to 100 percentage points post-intervention from baseline levels of 99, 93 and 97 percentage points respectively. Setting Penalties ratings increased from 89 percentage points

pre-intervention to 96 percentage points post-intervention. However, these increases were already observed by the second baseline measure, and may not be due to the introduction of the intervention. The largest increase was seen in Voice ratings, which increased by 47 percentage points from baseline to intervention.



Week	2	3	4	5	6	7
Viewing frequency					0	7

Figure 9. Whistle, Body, Hand Signals, Voice and Setting Penalties ratings for Shannon.

Shannon reported watching her video seven times, all within the first week of her intervention phase. Whistle ratings for Shannon increased by 1 percentage point from baseline, while Body ratings increased by 11 percentage points, with both ratings reaching 100 percentage points in the last week of the project. Hand Signals ratings increased from 57 percentage points at baseline to 74 percentage points at intervention. There was a large amount of variability in the Hand Signals data. Shannon's Voice ratings were low, only increasing from 19 to 21 percentage points from pre-intervention to post-intervention. Setting Penalties ratings increased from 45 to 69 percentage points from pre-intervention to post-intervention.

Brinley-Blampied plots. Brinley-Blampied plots (Blampied, 2007; Brinley, 1965) are similar to scatterplots and are used to present data from different samples, time periods or conditions in order to inspect the data for systematic differences (Rucklidge & Blampied, 2011). Systematic variations of the data points above or below the 45° diagonal line indicate systematic differences between data in the two conditions, groups or time periods. Brinley-Blampied plots in Figure 10 below show behaviour ratings from Week 1 plotted against those of Week 7 for Whistle, Body, Hand Signals, Voice and Setting Penalties ratings.

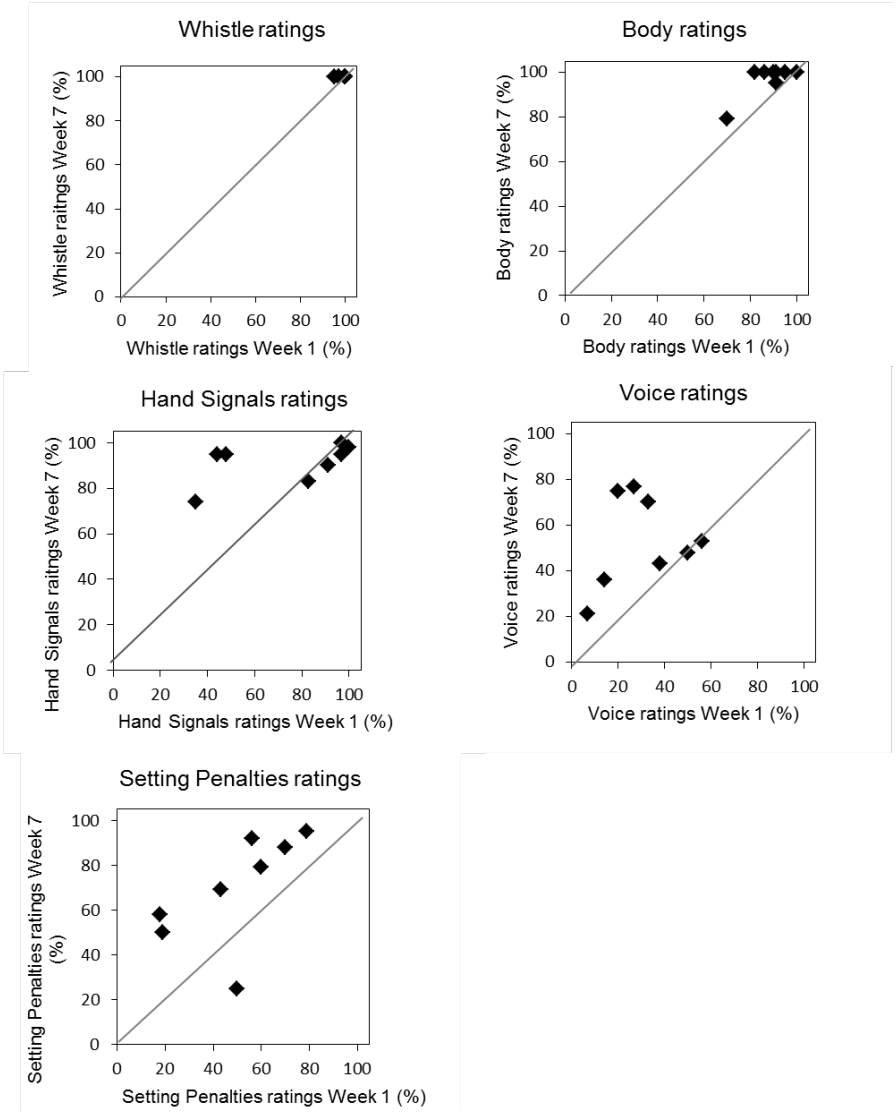


Figure 10. Week 1 behavioural ratings compared to Week 7 behavioural ratings for Whistle, Body, Hand Signals, Voice, and Setting Penalties ratings of each participant.

The Brinley-Blampied plots presented in Figure 10 indicate that there was little change in Whistle or Body ratings over the six-week observation period as both behaviours had high ratings at Week 1 and Week 7. Three participants (Lily, Diana, and Shannon) had systematic increases in Hand Signals ratings from Week 1 to Week 7. Voice ratings increased from Week 1 to Week 7 for Amy, Lily, Claire, Megan and Shannon. Setting Penalties ratings increased for all eight participants with the exception of Lily.

Percentage of Non-overlapping Data. Percentage Non-overlapping Data for participants Amy and Grace was calculated to be 60% and 66.67% respectively, which does not meet criteria for an effective intervention. Percentage Non-overlapping Data for Lily was 80%, reflecting an effective intervention while for Claire, Diana, Courtney, Megan and Shannon, PND was calculated to be 100%, indicating that this was a very effective intervention. However, PND does not take into account the distance between the points, so even very small changes may produce a high PND score if multiple points do not overlap.

Self-report Data

Self-efficacy. Self-efficacy ratings were obtained from the REFS (Myers et al., 2012). Participants were asked to rate how confident they were about certain aspects of umpiring on a 5-point Likert scale. Total scores were summed from 18 items over the four subscales of Game Knowledge, Decision Making, Pressure and Communication. Figure 11 presents the total pre- and post-intervention self-report ratings of self-efficacy for umpiring for each participant.

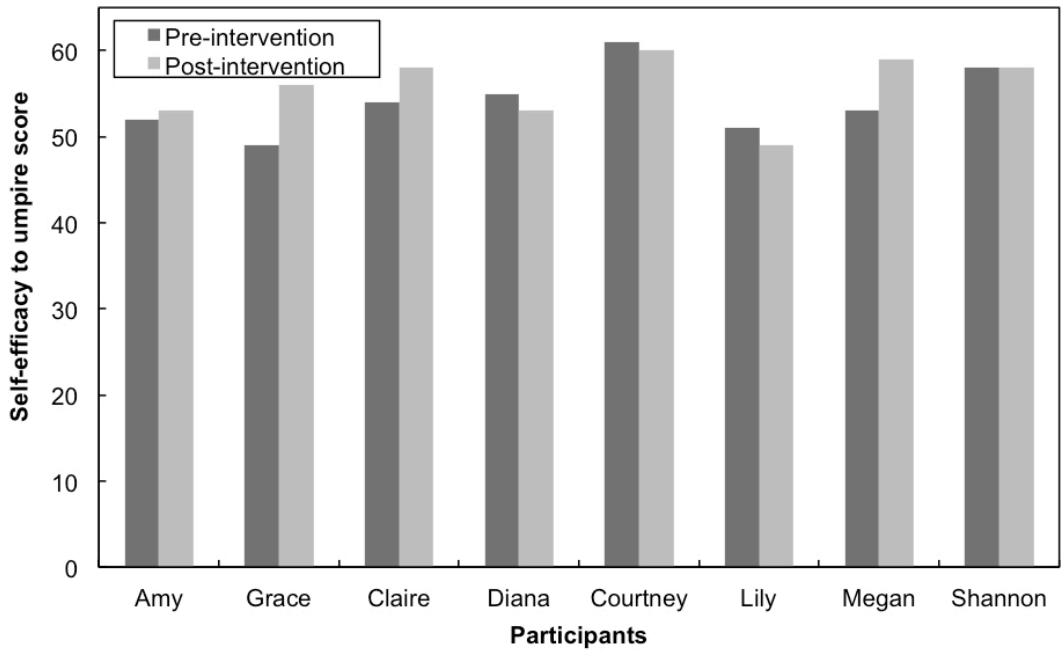


Figure 11. Pre- and post-intervention scores of self-efficacy to umpire.

Amy, Grace, Claire and Megan showed respective increases in self-efficacy of 1, 7, 4 and 6 points from baseline to intervention, indicating that they felt more confident in their umpiring ability after the VSM intervention. Shannon had no change in her self-efficacy rating of 58. The ratings of Diana, Courtney and Lily decreased by 2, 1 and 2 points respectively which indicated that they felt less confident in their umpiring ability after the VSM intervention. On average across all eight participants, there was an increase of 1.63 points (SD = 3.58) in self-efficacy ratings from baseline to intervention.

Motivation. Table 3 below presents the pre- and post-intervention self-report ratings of each participant for each type of motivation. The six types of motivation refer respectively to whether respondents engage in umpiring because a) it is interesting and enjoyable; b) it reflects their values; c) it helps personal development; d) it increases self-worth; or e) it is externally rewarding; or whether f) they no longer have a reason to engage sport (Pelletier et al., 2013).

For pre-intervention ratings, participants averaged the highest score on the subscale that measured intrinsic motivation (M = 18.13, SD = 2.03) and lowest on the subscale that measured amotivation (M = 5.38, SD = 2.20). Likewise, the highest scores for post-intervention ratings of motivation were obtained, on average, for the subscale measuring intrinsic motivation (M = 17.13, SD = 3.34) and the lowest scores were obtained on the amotivation subscale (M = 5.13, SD = 2.42). This indicated that participants experienced high levels of intrinsic motivation and low levels of amotivation towards umpiring both before and after the VSM intervention.

Table 3

Pre- and Post-intervention Participant Self-report Ratings for Six Types of Motivation

	Types of Motivation (total = 21 for each subscale)											
	Intrinsic		Integrated		Identified		Introjected		External		Amotivation	
Participants	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Amy	15	18	17	19	18	18	16	15	3	5	3	4
Grace	19	15	13	12	14	13	10	12	8	11	5	7
Claire	19	19	17	18	14	16	15	17	8	7	5	6
Diana	18	18	15	14	13	13	14	12	10	9	9	10
Courtney	20	20	17	17	14	11	17	14	9	6	4	3
Lily	16	12	14	12	10	9	13	10	10	5	3	4
Megan	21	21	20	21	20	21	14	20	11	5	8	3
Shannon	17	14	19	19	15	14	17	15	9	8	6	4
Mean	18.13	17.13	16.50	16.50	14.75	14.38	14.50	14.38	8.50	7.00	5.38	5.13
SD	2.03	3.14	2.39	3.42	3.06	3.85	2.33	3.16	2.45	2.20	2.20	2.42

On average, there was little difference between pre- and post-intervention ratings of integrated regulation, identified regulation and introjected regulation types of motivation, with less than half of the participants showing increased ratings.

The intrinsic subscale ratings decreased on average by 1 point at post-intervention. At an individual level, only Amy indicated feeling more intrinsically motivated to umpire at post-intervention (an increase from 15 to 18 points). Megan had the highest possible score for intrinsic motivation at both pre- and post-intervention. Megan also showed increases in integrated regulation, identified regulation and introjected regulation, and a decrease in amotivation. Grace, Lily and Shannon all showed respective decreases of 4, 4, and 3 points in their ratings of intrinsic motivation to umpire and had the lowest intrinsic motivation scores at post-intervention. Lily in particular showed decreases on all subscales of motivation to umpire and an increase in amotivation. Intrinsic motivation ratings of the remaining three participants remained the same.

The external regulation subscale aimed to measure whether participants were motivated to umpire in order to obtain rewards or avoid punishment. External regulation subscale ratings decreased on average by 1.5 points at post-intervention. Six participant ratings decreased at post-intervention indicating that they were less motivated by reward and punishment than at pre-intervention, with the exception of Amy and Grace whose scores increased by 2 and 3 points respectively. Grace's introjected regulation ratings also increased, indicating that she became more motivated to umpire in order to increase self-worth.

Participant ratings of amotivation were typically low (6 or below) at both pre- and post-intervention, with the exception of Diana, whose amotivation score of 9 at pre-intervention increased to 10 at post-intervention. The amotivation scores of Amy, Grace,

Claire and Lily also increased from pre- to post-intervention, suggesting a decrease in their motivation to umpire.

Satisfaction. Participants rated satisfaction with their game management skills on a 10-point Likert scale with a single item at pre- and post-intervention. Figure 12 shows the pre- and post-intervention ratings of satisfaction with game management skills for each participant.

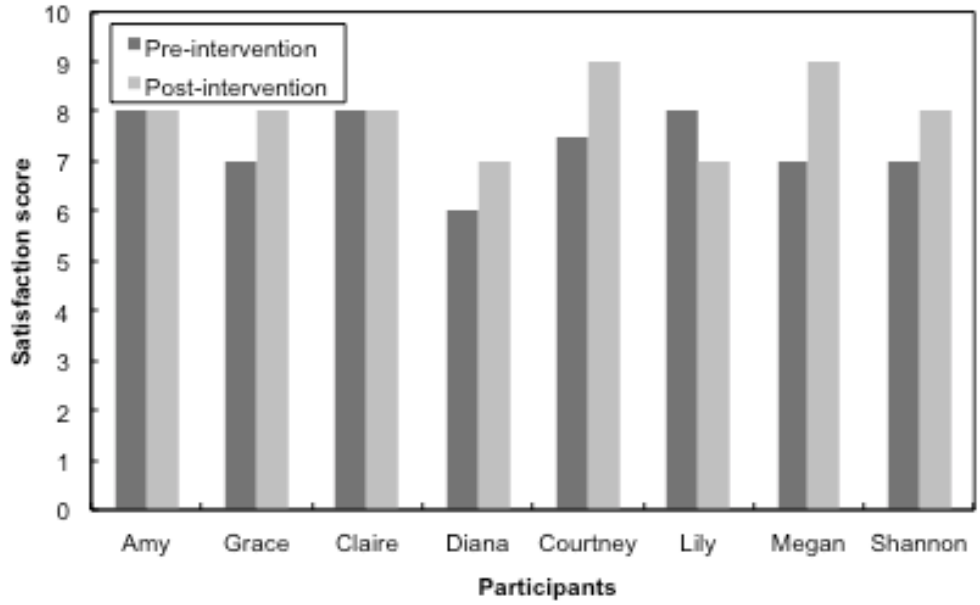


Figure 12. Pre- and post-intervention scores of satisfaction with game management skills.

Grace, Diana, Courtney, Megan and Shannon had increased self-report ratings of satisfaction with their game management skills by 1, 1, 1.5, 2 and 1 point respectively. Lily was the only participant who had a decreased post-intervention rating of satisfaction, which was one point less than at pre-intervention. Amy and Claire did not have any change in their ratings of satisfaction in their game management skills. The mean change in satisfaction with game management skills was 0.69 (SD = 0.96). Participants on average reported an increased satisfaction in their game management skills of 9.4% from pre-intervention.

Self-efficacy to manage challenging game scenarios. Figure 13 shows the pre- and post-intervention self-report ratings total of how well participants thought they would manage three difficult match scenarios, each scored on a 10-point Likert scale.

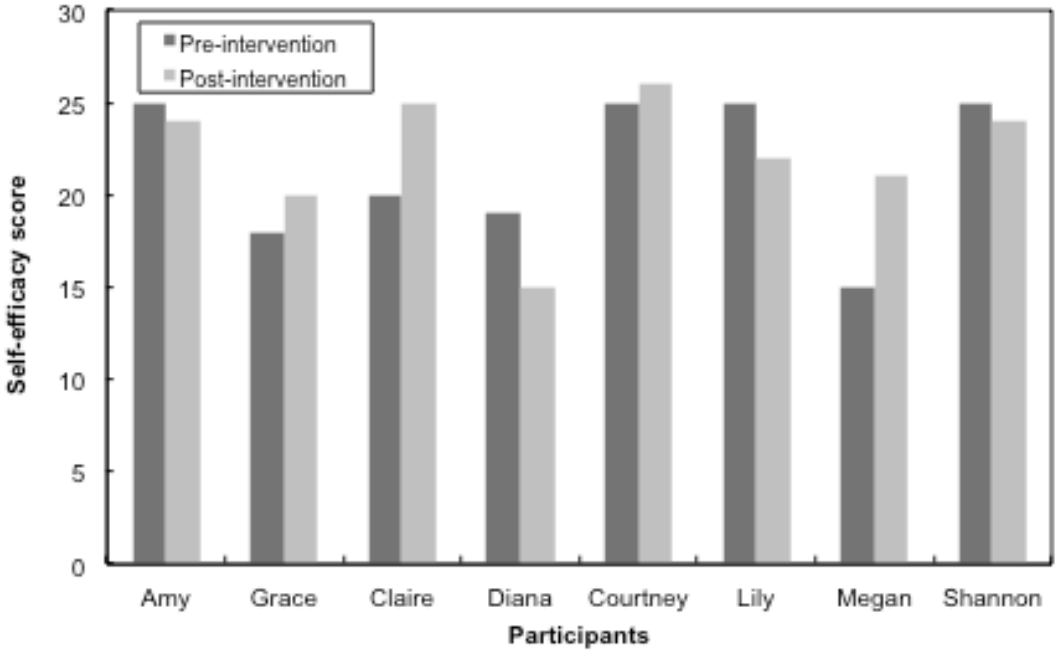


Figure 13. Pre- and post-intervention scores of self-efficacy to manage challenging match scenarios.

At post-intervention, Grace, Claire, Courtney and Megan had increased ratings of self-efficacy to manage challenging match scenarios, by 2, 5, 1 and 6 points respectively. Amy, Diana, Lily and Shannon decreased their ratings by 1, 4, 3 and 1 points respectively. The average change in ratings of self-efficacy for the three scenarios was an increase of 0.63 (*SD* = 3.58), indicating a slight increase overall.

At pre-intervention some participants had 'passive' responses to these scenarios, such as ignoring the situation or listening to a player's complaint. At post-intervention, no participant suggested "ignoring" as a response. Participants instead offered responses such as

"I stand by my decisions" or "I called what I saw", in addition to warning players or advancing penalties.

Qualitative Data

Qualitative data was examined for themes of why umpires begin, continue and cease involvement in netball umpiring, and whether abuse is a factor in umpire attrition. Themes are explored under the categories of recruitment, retention, attrition, and abuse.

Recruitment. All participants in this project had been introduced to the sport of netball as players before beginning their role as umpires.

Social influence. Seven of the eight participants had been encouraged to umpire by someone close to them. One participant stated that her mother had seen umpiring advertised publicly. Three participants became interested in umpiring after witnessing their older sisters umpiring. Two participants were asked to umpire by a friend, and another by a netball coach. Only one participant entered umpiring without external prompting.

Motivation. In terms of motivation to begin umpiring, enjoyment was a significant factor. Two participants enjoyed playing netball and thought that umpiring could be enjoyable also. Three participants began umpiring because it "looked like fun" and they wanted to "give it a go". One participant wanted to follow in the footsteps of her older sister.

Retention. All participants in this project indicated that they intended to continue both playing and umpiring next season, mentioning that umpiring brought them certain rewards. Participants offered several reasons for their continuation as umpires.

Enjoyment. All participants mentioned some aspect of enjoyment when asked about why they continue to umpire. Specifically, three participants liked the feeling of control they gained when umpiring. They enjoyed blowing the whistle and having the ability to influence the game. Two participants enjoyed the opportunity to have a positive effect on the game for the players. One participant acknowledged that practice was necessary to enjoy umpiring.

Achievement. Four participants were particularly motivated by progressing as an umpire and receiving positive feedback on that progress. This included being selected for tournaments. Shannon identified that she liked "going up the levels", referring to the levels of qualifications umpires can gain through their local netball centre. For another participant, succeeding in each game by making correct calls and having a good position in relation to the game was motivating. Another participant enjoyed knowing that she had made the right calls. Game quality was also important for retaining developing umpires. For Grace, the ability to progress to more competitive, higher-ranked games and to succeed was imperative to her remaining in the sport. Two participants also mentioned that fast, competitive games are more enjoyable.

Community. Four participants mentioned that they enjoyed meeting new umpires and the social aspects of umpiring. Two participants in particular enjoyed the routine of umpiring on a Saturday, as well as the feeling of "being part of it all". For example, the organisation around collecting the score card from the window and meeting the co-umpire was a positive experience. One participant thought that the organisation of the umpire coaches in particular was "really cool".

Personal development. Participants also discussed ways in which the umpiring role has helped them in developing other skills. Firstly, three participants spoke about umpiring improving their self-confidence. One participant expressed that she was very shy when she began umpiring, but the role has given her confidence which in turn allowed her to enjoy the role more. Another suggested that umpiring has helped her feel more confident about interacting with other people in other areas of her life. Secondly, fitness was identified as an aspect of enjoyment of umpiring as well as a reason to remain in the sport despite other commitments. Thirdly, seven of the eight the participants reported that umpiring gave them a different perspective of the game to playing. Five participants felt that this had enhanced

their playing performance through increased rule knowledge, learning more about the game, identifying new game plays and having a different view of the game. Lastly, one participant identified that umpiring had helped her with time-management skills.

Attrition.

Challenges in umpiring. All participants identified that umpiring was a challenging activity. Examples of challenges were learning all of the rules; ignoring distractions; taking responsibility for self-improvement in order to avoid failing the players; making accurate decisions quickly; acquiring the mental skills required to perform optimally; and responding when players asked a question.

Competing commitments. When asked why participants might leave umpiring, six participants felt that they may leave umpiring if other commitments, such as university, work or playing netball, began to require more time. Three participants felt that they would keep umpiring while they played but indicated that when they stopped playing, they may stop umpiring. Grace thought that if she was not progressing in terms of game quality and being offered opportunities such as umpiring at tournaments, then she would leave umpiring.

Preventing attrition. Regarding the prevention of attrition, participants were asked "If you were thinking of quitting, what would make you stay?" Participants had differing ideas about this, including showing promise in umpiring; positive feedback from others; fitness; making progress; going to tournaments; being part of the community on Saturdays; and more support from parents, friends, coaches and spectators.

Support from family and friends could include sideline support. Five participants liked having their parents, siblings or friends on the sideline as they felt it represented moral support. One participant liked to gain feedback on her umpiring as well as emotional support from her older sister on the sideline. Two participants did not like to be watched by people who knew them as they felt this added extra pressure to their role. For example, one

participant felt that she would worry what her friends and family would think if she made a mistake. One participant identified that it was easier to concentrate without friends and family there.

Four participants did not mind their umpire coach being present at the court, but found that it could be distracting. However, two participants particularly liked their coaches being there to obtain feedback on their performance.

Abuse.

Frequency and types. Only one participant did not report experiencing any kind of abuse while umpiring. Two participants expressed that they had experienced abuse while umpiring at venues outside the local netball centre. Five participants could describe at least once incident of abuse while umpiring at the local netball centre. All abuse described had been delivered verbally. During matches, this included players swearing at the participant, players yelling at the participant from the court, players disputing calls angrily and players making comments such as "Open your eyes!" Participants also reported being approached by players and parents, at quarter-time and half-time intervals during the match and after the match, with comments such as the participant "shouldn't umpire", "didn't do a good job", or "don't know anything". One participant felt that she was not respected as much as older umpires due to her age and small build.

When asked who they would not like on their sideline, six participants discussed loud and abusive spectators, coaches and players. One participant felt that hearing comments from players and coaches made her involved somehow in what they were saying.

Coping. Participants were asked to describe how they usually coped with abuse. Five of the eight participants indicated that they would ignore the abuse, either deliberately or because they did not know what to do. Six participants also mentioned that they knew they could penalise players on-court; advance penalties; warn players; hold time and speak to the

players or spectators; or get help from the netball centre volunteers. However, four participants mentioned that at the time of the abuse, they had not known what to do. Four participants also spoke about feeling "upset" at the time or after the abuse had taken place. Only Diana felt that she may leave due to verbal abuse while umpiring.

To summarise, this group of participants were typically recruited through the efforts of friends or family. They began umpiring as an extension of playing netball and because umpiring looked enjoyable. Participants reported that they remained in the umpiring role as they enjoyed having an influence on the game, progressing through the qualifying levels of umpiring, attending tournaments, receiving positive feedback, and being part of the netball community. Participants reported benefits of umpiring such as improvements in self-confidence, time management skills, fitness and netball playing skills. Participants anticipated remaining in the role in the near future and struggled to provide reasons that they would currently leave, but indicated that they may leave the sport in the future if they stopped playing netball; if they were no longer progressing as an umpire; or if work, study or netball commitments increased. Opportunities to attend tournaments, receive positive feedback, be part of the community and improve fitness would encourage participants to stay despite challenges.

A majority of participants had experienced verbal abuse while umpiring, primarily in the form of comments from players and coaches. Participants tended to ignore abuse but knew that there were options available should they wish to act. Sideline support from parents, siblings, friends and umpire coaches was generally appreciated by participants.

Social Validity

The social validity of the VSM intervention was assessed as part of the semi-structured interview. Participants were asked about the how useful, motivating and stressful they found the VSM intervention and whether or not they would use a VSM intervention

again. This was done to assess whether the VSM intervention was perceived to be successful and acceptable by the participants.

All eight participants stated that they found the VSM video useful. In particular, participants talked about umpire-specific skills such as learning hand signals and evaluating their position on the sideline in relation to the game. Participants also reported that it showed them how to respond to players, coaches and spectators in terms of "knowing what to say" in difficult situations. Megan reported that she had replicated the responses shown in her VSM video in a real game, with positive results. Two participants explained that the VSM video showed that they could actually perform the behaviours on the video in reality. Overall, the videos were used by participants to make a comparison between the performance of the participant at the time and the performance viewed on video, with the video serving as a model. Four of the participants found it motivating to watch themselves respond to and interact with the players, coach and spectator.

Three of participants expressed criticism of their performance in the video, despite the video showing them successfully performing skills. Two participants said that they spoke "too quietly" in their videos and that they needed to be louder when umpiring. Another two participants used the video to identify aspects of their umpiring which needed improvement. After watching her video, Grace felt that she could understand why umpires were not taken seriously by coaches and expressed that umpires need to be confident and serious.

All of the eight participants found it difficult, "weird" or "funny" to watch themselves on their VSM video at first. Two participants found it uncomfortable to watch the players, coach and spectator yelling at them in the video. Grace expressed that it felt like it had happened in reality even though she knew the video had been edited. She felt that she could not perform the responses in real life as she lacked the confidence to confront people older than her in that way.

Summary

Overall, game management skills of the eight participants increased from baseline to intervention according to behavioural ratings. In particular, Hand Signals, Voice and Setting Penalties ratings had increases following the introduction of the VSM intervention for some participants. There were no consistent significant increases in any specific game management skill immediately after the introduction of the VSM intervention for all participants. Furthermore, the increase in level of observed skills appeared to be due to a continuation of the increasing trend present in the baseline phase.

Self-report ratings increased from pre-intervention to post-intervention on measures of self-efficacy to umpire, satisfaction with game management skills and self-efficacy to manage challenging match scenarios. Increases were small and there were high levels of variation between participants. Self-report ratings of intrinsic motivation to umpire were high at pre-intervention and decreased at post-intervention. For some participants, there was a connection between self-report ratings, discussed in the following section.

Social validity results indicated that participants found the VSM intervention useful for developing general umpiring skills such as knowledge of positioning and hand signals, as well as for developing specific responses to sideline comments. Participants also suggested that the intervention increased their confidence or self-efficacy to perform the behaviours demonstrated in the video even though they found it difficult to watch themselves at first.

Qualitative information gathered during the semi-structured interview indicated that participants were encouraged by others to umpire as an extension of their involvement with playing netball. All participants enjoyed umpiring despite its challenges, especially the opportunities to achieve in sport, to develop other skills and to be part of the netball community. While no participant could foresee their immediate withdrawal from umpiring, factors such as time commitment, lack of progress, or withdrawal from playing netball were

suggested as barriers to continuing to umpire. Abuse had been experienced by a majority of the sample, but it was not considered an important factor in leaving netball umpiring. The next chapter offers a discussion of these findings.

Chapter 4: Discussion

The detrimental effects of the abuse of umpires have been recognised in the umpiring literature and can include umpire attrition, stress, burnout, and performance deficits. Despite acknowledgement of these effects, there is a significant lack of interventions addressing issues related to umpire abuse and attrition. Feedforward VSM has been used with relative success with adolescent samples in the sporting context. The purpose of the current study was to explore the use of VSM with young umpires in the context of mitigating umpire abuse and attrition. The current study aimed to assess the effects of a VSM intervention on the game management skills, self-efficacy, motivation, and satisfaction of adolescent netball umpires. The study also aimed to evaluate the social validity of a VSM intervention in this context and to explore why adolescents may begin, continue or withdraw from umpiring.

Each main finding will be discussed below in relation to previous literature and relevant theories. Following this will be a discussion of theoretical and practical implications of the findings, the overall limitations of the study, and possible directions for future research. The chapter will conclude with a final summary.

Game Management Skills Findings

Findings from the current study did not support the hypothesis that the VSM intervention would result in an improvement in five game management skills of adolescent netball umpires. Behavioural data did suggest a) that Hand Signals, Voice and Setting Penalties skills of some participants improved after the introduction of the intervention, b) that overall game management skills of the participants improved over time, and c) that the VSM intervention was *effective* or *very effective* at increasing game management skills for six of the eight participants. Specifically, the Voice skills, which were consistently the lowest of all measured game management skills, increased significantly after the introduction of the VSM intervention for most participants. Further effects of the VSM intervention may not

have been observed due to high baseline ratings, especially for Whistle and Body ratings of some participants. These findings are promising; however, an increasing trend in game management skills during the baseline phase indicated that overall increases could not be accounted for by the VSM intervention alone. A discussion of the observed high baseline ratings is followed by an examination of Voice ratings and confounding variable which may have produced an increasing baseline trend. Factors which may have influenced the effectiveness of the VSM intervention are then discussed.

Potential ceiling effects. The effects of the VSM intervention may not have been fully observed due to high baseline levels. The baseline ratings of game management skills for each participant were very high for categories of Whistle, Body and Hand Signals, which may have produced a ceiling effect. High baseline ratings may have been due to the criteria used for measuring successful performance of these skills. In the current study, successful performances for Whistle ratings were obtained when the whistle was loud and clear. Baseline ratings for Whistle were at least 97 percentage points for all participants, indicating that participants were using a loud whistle at almost all opportunities to do so. However, more complex uses of the whistle, such as a shorter whistle at penalties and a longer whistle at stoppages, were challenging to accurately code from the video footage because this criteria is more subjective and in retrospect required careful definition. Perhaps the criteria for performing the target skill was too easily attainable for even developing umpires. A more rigorous success criteria may have reduced the potential for the ceiling effect but this may also have required a more comprehensive coding process.

Voice ratings. Baseline voice ratings were consistently the lowest of all the skills ratings for all eight participants with the exception of Diana, possibly as a result of poor audio quality, low participant confidence, or low IOA. The criteria for an observed performance of Voice was that "voice is loud and clear, with correct terminology when

calling penalties, calling the Centre Pass, calling advantage, holding the play for safety, and setting penalties". During the interview, Lily and Shannon both reported that they recognised that they needed to be louder when umpiring after watching their personal VSM videos. Lily's Voice ratings increased rapidly throughout her five-week intervention period. Shannon's Voice ratings, however, did not increase significantly even after seven video viewings. Even with the increases in level throughout the intervention phase for most participants, Voice ratings remained the lowest at Week 7 for all participants with the exception of Lily. This may suggest that for some umpires the use of voice in umpiring may require more training than other skills and that further development in this area may contribute to improving overall game management skills.

One explanation for low Voice ratings was the quality of the audio which was used for Voice coding. The researcher initially asked participants to wear a point-of-view camera, such as a GoPro with an external microphone, but participants were not comfortable with wearing the device while umpiring. Voice ratings were therefore coded from video footage taken from the side of the netball court with the JVC camcorder. Participants were at times 10-15 metres away from the camcorder. The JVC camcorder did have a zoom microphone to allow for enhanced audio; however there was considerable background noise from players, coaches, spectators, and other umpires, thus reducing the quality of sound. Voice may therefore not have been coded as a successful attempt by the researcher and observer.

Low Voice ratings may also be a reflection of low confidence (Kimble & Seidel, 1991; Scherer, 1973). Findings from this research suggested that confidence can naturally encourage the use of a louder voice and that a louder voice can be used to artificially portray confidence. In the case of umpiring, an umpire may have a quieter voice when they are less confident that they are making a correct call than when they are certain of their decision. Even if the umpire is confident in the accuracy of their decision, a quieter voice may suggest

to players, coaches, and spectators that the umpire is unsure of their decision, potentially leading to a lack of confidence in the umpiring decisions and an increase in abuse of the umpire. Increasing the confidence in young umpires may promote their use of voice in challenging match scenarios.

Interobserver agreement below 50% reflected difficulties in the coding of the Voice data. There may have been some coding errors due to the pressure of coding simultaneous audio and visual material. In particular, at each goal scored, there was an opportunity for blowing the Whistle, signalling the next pass, calling the next pass and blowing the whistle for the next pass. Some opportunities or successful performances of "calling the Centre pass" may have been missed at these occasions resulting in Voice ratings which were not representative of the learning of the participants. Further development of an operational definition for Voice skills while umpiring could assist in reducing discrepancies while assessing this skill in future studies and additional training for coding Voice may be required.

Confounding variables. Increasing trends throughout a baseline phase demonstrated that improvements occurred without the introduction of an intervention (Blampied, 2001). In the current study, an increasing baseline trend in game management skill ratings was present for five of the six participants who had adequate baseline data. The increasing trend throughout baseline and intervention phases suggested a practice effect, whereby participants improved in game management skills as they had gained more experience of umpiring netball throughout the season. Furthermore, the courtside presence of the researcher, camcorder and tripod may have resulted in an observation effect, or the Hawthorne effect (Mayo, 1933). In this case, paying attention to target behaviours during the 10-minute sampling periods could have naturally induced improvements in those behaviours regardless of intervention, much like the study of Murray, Swan, Kiryluk, and Clarke (1988) with over 6000 English adolescents which suggested that repeatedly measuring smoking habits may result in a

decrease in their smoke inhalation rates. Indeed, all participants in the current study identified the camcorder as soon as the researcher arrived at the court and were aware that their behaviour was being filmed as part of the study. To overcome this problem, observation effects could be managed in future studies by using a discreet filming device, such as a lapel camera, operated by an individual who was not known to the participants.

Another confounding variable may have been that the participants also continued to receive regular coaching from their respective umpire coaches throughout the baseline and intervention phases. This may have confounded the effects of the VSM intervention and partially accounted for the increasing trends in the baseline phase. It would have been unethical, however, to insist that participants withdraw from the standard coaching services provided by the local netball centre as this may have negatively impacted their umpiring development and even affected their chances of selection for tournaments. In future, this could be resolved by recruiting participants who are not involved with any type of umpire coaching service.

Overall, future studies could adapt several aspects of the design to reduce the influence of practice effects, observer effects, and coaching influence.

Reduced effectiveness of VSM.

Content of VSM video footage. In addition to high baseline ratings, the content of the VSM videos may have influenced the effectiveness of the VSM intervention. Previous studies which used FF VSM with adolescents in a sporting context indicated improvements in the target skills (see Rymal et al., 2010; Sté-Marie, Rymal, et al., 2011; Sté-Marie, Vertes, et al., 2011). In these studies the VSM video footage was very specific, focusing only on the target skills with little or no contextual content. In contrast, in the current study VSM videos were approximately three minutes in duration and covered seven different scenarios and a range of game management skills. These VSM videos contained a significant amount of

footage of volunteers role-playing as players, supporters, and a coach, in addition to the participant and were edited to portray the participant umpiring a complete netball match. It appears that in some cases the peripheral content in VSM video may distract from the target content and reduce the effectiveness of the VSM intervention (Buggey, 2005; Rymal et al., 2010). Supplementary contextual content in the current study may have reduced the focus on the target skills or on the participant and thus reduced the effectiveness of the VSM intervention.

Inadequate VSM video viewing. In the current study, the researcher relied on the participants to watch the three-minute VSM videos of their own accord and to accurately report the date and time they watched their video. The researcher suggested to participants that several viewings each week would be appropriate. Amy and Lily only watched their VSM videos three times in the final three weeks of the intervention phase. Amy recorded decreased Body, Hand Signals, Voice and Setting Penalties ratings during this time. Lily had decreases in Body and Setting Penalties ratings in Week 7 although this may have been due to reported illness. Shannon and Megan reported watching their personal VSM videos seven times in one week of the intervention and not watching it at all in the other week of the intervention phase. It was not possible to determine a relationship between this pattern of viewing and the behavioural ratings due to lack of data for Megan and Shannon.

It has been noted that attending to material is necessary for learning to occur (Bandura, 1977; Nikopoulos, 2003), so if the participants were not provided with adequate opportunities to view their VSM video footage or did not attend to it when viewing, then learning would not have occurred. The opportunity to view and attend to the VSM videos may therefore affect the effects of the VSM intervention in the current study. Regarding the number and length of VSM viewings required for optimal learning, Buggey and Ogle (2012) suggested that changes take place in the first three viewings of the VSM material and

Dowrick (1983) suggested that 2.5 minutes was an appropriate length for a VSM video. According to these suggestions, which are yet to be established by empirical studies in the published literature, participants in the current study appear to have had adequate opportunities to view and attend to the video content. However, perhaps when participants cease watching their video or complete many viewings in a short period of time, as occurred in the current study, the intervention may be less effective.

The current study relied on participants to self-report video viewing occurrences. The researcher intended that accurate recording of video viewings by participants would accurately portray the frequency and length of the intervention. However, Claire and Courtney reported viewing their VSM videos on dates that occurred outside the intervention period, either before they had access to the video diary recording sheet or after submitting the video diary recording sheet. Claire and Courtney could not offer an explanation for these conflicting records. These inaccuracies suggested that some video diary recordings were inaccurate for at least two of the participants, which limits the extent to which the video diaries can be used as a measure of viewing frequency and thus the commencement of VSM intervention. These inconsistencies highlight the limitations of using a self-report method to assess treatment integrity, which include social desirability bias, recall bias, or errors in recording (Ainsworth, Montoye, & Leon, 1994). Sté-Marie, Rymal, et al. (2011) resolved this self-reporting issue by having the researcher be present while participants were watching the videos. However, this was not practical for the current study.

Self-report Findings

Self-efficacy. Findings from the REFS self-report measure and the responses to the challenging game scenarios measure somewhat supported the hypothesis that ratings of self-efficacy towards umpiring skills would increase from pre-intervention to post-intervention,

with increases for some, but not all, participants. However, increases in self-reported self-efficacy were not associated with increases in observed game management skills.

In the current study, Grace and Megan both indicated increases in the two measures of self-efficacy but did not show significant increases across game management skills. Conversely, Lily did not have increased self-efficacy scores at post-intervention but showed improvements across game management skills. These mixed results are similar to the other studies assessing VSM interventions with the sporting skills of children and adolescents (Clark & Sté-Marie, 2007; Sté-Marie, Rymal, et al., 2011; Sté-Marie, Vertes, et al., 2011; Winfrey & Weeks, 1993). It appears that self-efficacy ratings do not consistently reflect observed performance of skills.

There are some differences in the methodology of previous studies and the current study which may account for differences between findings. In previous studies, self-efficacy measures were very specific to the VSM video. For example, Sté-Marie, Rymal, et al. (2011, p. 297) used items such as "I can do the video portion of the routine with less than seven errors". In contrast, the current study used a general measure of self-efficacy to umpire, as well as a specific measure of self-efficacy to manage challenging match scenarios. As the general measure of self-efficacy related to skills that were not portrayed in the VSM video, such as "I understand the basic strategy of the game", the measure used in this study may not have been specific enough to detect changes in self-efficacy or obscured increases in skills depicted in the VSM video. Indeed, the largest increase in ratings occurred in the *Pressure* subscale, which assessed self-efficacy to be not influenced by various groups such as players and coaches. This aspect of umpiring was portrayed strongly in the VSM videos. Therefore, changes in self-efficacy may be specific to the particular behaviours clearly depicted in a VSM video and may not always generalise to the activity in general.

Motivation. Intrinsic motivation ratings indicated that all the participants were highly motivated to umpire. However, only Amy showed increases in intrinsic motivation ratings at post-intervention. Amotivation ratings were low at pre-and post-intervention, but increased for five participants. Results therefore did not support the hypothesis that motivation to umpire would increase after the introduction of a VSM intervention.

Lack of increases in intrinsic motivation and other types of motivation, and increases in amotivation, could be an indication of burnout and/or the result of the timing of the post-intervention measure (Cresswell, 2005). In the current study, the first measure of motivation was taken during the third week of the netball season. High initial ratings of intrinsic motivation perhaps reflected that participants were excited and energised for the upcoming season. The post-intervention measure was taken six weeks later, at a point more than halfway through the season, at the end of university exams, and at the end of an 11-week school term. In addition to umpiring at least one game each week, all eight participants played netball and three participants coached a netball team as well. Therefore, decreases in intrinsic motivation and increases in amotivation in the current study may reflect burnout in the participants due to high workloads. Indeed, some participants were experiencing injuries or illness throughout intervention, as seen by their absences from the weekly behavioural measures, or were absent due to university assessments.

Alternatively, watching the VSM videos may be associated with decreases in motivation to umpire. Several participants were critical of either their performance in their individual VSM video or their actual umpiring performance in comparison to the VSM video. This may have resulted in the observed decrease in motivation to umpire, as participants may have perceived themselves as performing less successfully than expected. This seems unlikely however, as all participants reported that the intervention was useful and positive, and would use it again.

Satisfaction. Results from the single self-report item assessing satisfaction with game management skills supported the hypothesis that satisfaction ratings would increase from pre-intervention to post-intervention. There was an overall increase in average satisfaction ratings across seven participants with only Lily indicating decreased satisfaction ratings from pre- to post-intervention.

This finding is consistent with the findings of Clark and Sté-Marie (2007) which suggested that an increase in satisfaction with swimming skills was associated with the introduction of a VSM intervention when assessing satisfaction with a single item. No other published studies with VSM in sport have attempted to measure changes in satisfaction in relation to the introduction of a VSM intervention. These results imply that satisfaction with specific skills is linked to the use of VSM or modelling in general. However, there are limited conclusions one can draw from the increases on the one-item measure of satisfaction with game management skills.

Umpire Recruitment, Retention and Attrition

Participants in the current study reported entering umpiring with the encouragement of friends, family, or peers involved in sport, thus reflecting the importance of social context in entering the sport. Findings also indicated that adolescent umpires held a positive view of umpiring when entering the sport. Most participants knew someone involved in umpiring already and saw them as positive role models. Previous research has indicated that social recognition, social status, and peer affiliation are associated with the motivation of adolescent females to participate in sport (Allen, 2003). Therefore, adopting the role of an umpire could represent an opportunity to increase social status in the netball community, to gain social recognition from peers or to develop significant relationships with others.

In terms of retaining umpires, participants reported that areas of enjoyment, achievement, community, and personal development were important for current adolescent

umpires to remain in the sport. Participants reported that "being part of it all" and "meeting other umpires" were positive aspects of the role. This may reflect the importance of close peer relationships in adolescence and a feeling of belonging or acceptance. These findings reflect those of Allen (2003), which suggested that feelings of belonging are positively associated with interest or enjoyment in sport.

Given the significance of social context during the period of adolescence, the loss of social recognition, social status or peer affiliations may account for some of the attrition rate of adolescent umpires. Most participants suggested that withdrawal from playing netball may lead to a withdrawal from umpiring. Perhaps, playing netball provides an opportunity for social engagement that umpiring does not, and adolescents are reluctant to remain in the umpiring role without the social connections they receive while playing netball. Alternatively, adolescents may perceive that their role as an umpire is not acknowledged socially and may not provide them with adequate social status to continue in the role. Encouraging young umpires to continue to play netball may serve to increase retention rates by providing these social opportunities which may be lacking in umpiring.

While playing netball may provide social incentives to remain involved in community sport, it may also contribute to time pressures placed on umpires, particularly if the umpire also volunteers as a coach. Time constraints and lack of achievement or progress in umpiring were also cited by participants as potential reasons for withdrawal. Lack of achievement in umpiring may be linked to perceived social status. Adolescent umpires who do not perceive themselves to be progressing or achieving in the sport may feel that their social status is threatened, especially if their peers are achieving. Overall, adolescent umpires without a sense of belonging to a club, social recognition or opportunities for achievement may be less motivated, have lower self-efficacy, experience less enjoyment and appear to be more likely to withdraw from the sport (Allen, 2003).

Abuse of Adolescent Umpires

Findings from the current study indicated that adolescent netball umpires do experience abuse from players, coaches or spectators while umpiring. This abuse may be underestimated by sporting organisations if umpires do not report it. Adolescents in particular may be less likely to report abuse as they may fear negative consequences such as loss of social status, negative peer reactions, or loss of tournament opportunities. Sports organisations may need to provide a clear and non-judgemental pathway for reporting abuse incidents to gain a better understanding of issues faced by their volunteer adolescent umpires.

In terms of umpire attrition, all eight participants reported a return to umpiring in the following season despite experiencing abuse, although one participant indicated that she may consider withdrawing due to abuse she received. All of the participants reported struggling to manage abuse at the time. It appears that adolescent netball umpires in New Zealand do experience abuse while umpiring and the findings of this study indicate that they may require direct training on how to manage it effectively.

Triangulation

There appeared to be an association self-report, behavioural and qualitative data for Megan, Lily, Diana and Grace.

Motivation ratings for Megan, Lily and Diana appeared to be associated with other data. Megan had the highest possible score for intrinsic motivation at both pre- and post-intervention, and showed the largest increases in ratings of satisfaction with game management skills and self-efficacy to respond to difficult match scenarios when compared with pre-intervention measures. Meanwhile, Lily had the lowest score on intrinsic motivation at post-intervention, and showed decreases at post-intervention on all other self-report measures of types of motivation, self-efficacy to umpire, self-efficacy to respond to difficult match scenarios and satisfaction with game management skills. Lily also reported increased

amotivation. Diana's amotivation score of 9 at pre-intervention increased to 10 at post-intervention. Diana also demonstrated decreased ratings of self-efficacy to umpire and to manage difficult match scenarios and was the only participant who, in the interview, reported that she had considered leaving umpiring in the past.

Grace was the only participant who had a decreasing trend for game management skills throughout the intervention phase. She reported that she did not feel she could perform the behaviours depicted in her personal VSM video. As such, perhaps FF VSM did not appear to act as "learning from the future" in this case. Grace also had decreased intrinsic motivation and other types of motivation, increased amotivation, but an increase in self-efficacy and satisfaction with game management skills. Grace was critical of her performance in her VSM video and this self-critical approach may have reduced the effectiveness of the VSM intervention.

Therefore, while sample size and time constraints did not allow for multivariate or longitudinal analysis of data, findings from the current study suggest that there were some connections between motivation, self-efficacy, satisfaction, and responses to the VSM intervention.

Social Validity

All eight participants reported that they found the VSM intervention to be positive and useful, indicating that the intervention was perceived to be acceptable by participants. Participants also indicated that they would consider using a VSM intervention again, either in an umpiring context or other sporting contexts. The influence of social desirability bias should be considered when considering these positive findings, however. Participants may have adapted their responses to match the perceived expectations of the interviewer (Krumpal, 2013), i.e. they may have perceived that the interviewer expected that the VSM intervention was useful for participants. The social desirability bias may have been

exacerbated if participants were not confident that their responses would not remain private or confidential (Krumpal, 2013). It is important to consider the potential for social desirability bias because adolescents may be particularly influenced by a desire to adhere to social norms (Brown, 1986). As such, participants may not have perceived the intervention as conclusively positive as their responses suggest.

Participants also seemed to be critical of their performance in their personal VSM videos, despite the researcher editing the videos to demonstrate a positive performance of the target behaviours. This critical stance could relate to the mid- to late-adolescent stage of the participants in the current study. In female adolescents, there appears to be lower satisfaction with their bodies than male adolescents and a stronger relationship between body image and self-concept (Koff, Rierdan, & Stubbs, 1990). From this perspective, viewing videos of themselves may be quite confronting for young females adolescents. These developmental considerations could account for difficulties experienced by participants in watching their VSM videos.

Theoretical and Practical Importance

Implications for the use of VSM with adolescent umpires. Findings from the current study imply that VSM has potential for use with adolescent umpires in the context of managing umpire abuse, with some adjustment to the content of the VSM videos to enhance the intervention. Although results from the current study did not demonstrate that an increase in game management skills were attributable to the VSM intervention, results indicated overall increases in specific and overall game management skills of the participants. Furthermore, social validity findings indicated that VSM was perceived as useful and motivating by adolescent umpires, despite the challenges of watching oneself on video.

Video feedback is currently used in New Zealand as a form of self-analysis by umpires in various sporting codes but tends to be at elite sporting levels only. Qualitative

findings from the current study suggest, however, that adolescent umpires may experience some discomfort when viewing themselves through video, even when it has been edited to enhance their performance. Overall, findings indicate that there is an opportunity to introduce the use of VSM at an earlier stage of umpire development thus allowing developing umpires time to adjust to viewing themselves from a critical perspective and to gain additional skills development by its use.

In particular, VSM could be used to develop the use of Voice while umpiring. The use of Voice appears to be particularly important for umpires, as efficient and clear communication may reduce significant amounts of player and coach frustration (Cunningham et al., 2015). By targeting Voice skills above other game management skills, the VSM intervention would be more focused, addressing issues of distracting or unnecessary content which may have occurred in the current study. Findings from the current study indicated that VSM was effective in increasing the use of Voice skills of adolescent umpires. Future studies evaluating the use of VSM with Voice skills could contribute to the umpiring development and retention literature.

Implications for sports organisations. The current study identified some specific skills which could be developed further by sports organisations. First is the important role of Voice. Individual sports centres could be encouraged hold workshops which could highlight the importance of skills such as using a loud and clear voice while umpiring or setting penalties clearly and correctly. Specifically, sports organisations could emphasise the role of voice and communication to de-escalate player frustration.

Second, based on findings from the current study, recruitment strategies could focus on the importance of social incentives and motivation to potential umpires. Sports organisations could encourage individuals involved in sport to identify peers who have the potential to become umpires and to connect them with the local umpire coordinator. In order

to recruit more umpires, sports organisations could emphasise the benefits of umpiring to portray it as an enjoyable activity with opportunities for skill, fitness, community and social development.

Third, in terms of reducing the attrition rate of adolescent umpires, sports organisations could emphasise the positive aspects of joining their organisation such as developing a sense of belonging, social recognition, and achievement. In particular, organisations should ensure opportunities to progress through a hierarchy of levels, encourage attendance at workshops, support travel for tournaments, provide occasions to meet other umpires, and develop personal skills such as time management, fitness, confidence and communication. Social media could be used as a platform from which young umpires could be celebrated, organise group events and maintain a sense of belonging. Allowing umpires to continue to play their chosen sport while minimising any unnecessary time constraints associated with umpiring could also help to increase umpire retention rates.

Self-efficacy theory and implications. Bandura (1977) proposed that the level of self-efficacy of an individual to perform a specific task would predict the likelihood of the individual to perform that task, and that this experience would in turn increase self-efficacy. Results relating to self-efficacy are important because self-efficacy has been hypothesised to moderate the effects of stress and anxiety on performance in umpiring populations.

In the current study, there were increases in specific and general measures of self-efficacy for some participants. Overall game management of all participants appeared to increase over time. However, increases in self-efficacy and in targeted game management skills were small and/or inconsistent across participants. Therefore, the variable increases in self-efficacy and in game management skills in the current study provide neither support for nor evidence against the hypothesis of Bandura (1977).

Previous findings assessing changes in self-efficacy and target skill performance suggested that VSM interventions do not serve to increase the self-efficacy of children and adolescents to perform sport-related skills, even when the intervention is successful in improving sport-related skills in practice (Clark & Sté-Marie, 2007; Sté-Marie, Rymal, et al., 2011; Sté-Marie, Vertes, et al., 2011). Overall findings appear to indicate that increases in performances of targeted behavioural skills are not consistently associated with increased ratings of self-efficacy. Therefore, alternative interventions may be required if increasing self-efficacy is desired in addition to improving specific behaviours through VSM.

Limitations

This study was not without limitations. One limitation was the difficulty in obtaining adequate data points in both the baseline and intervention phases to enable a complete visual analysis of the data. Only three participants were present for all seven sessions of behavioural data collection. Even with full attendance, minimal baseline data points were able to be collected due to the time constraints of the netball season. This meant that some behavioural data had to be considered as pre- and post-intervention data and limited the conclusions that could be drawn about the effects of the VSM intervention. Although not practical for this study, a larger sample size and longer observation period would help to resolve this issue.

A second limitation of the study was the lack of measurement of rates of abuse directed towards the participants while they were umpiring. The VSM video showed the participants responding successfully to seven challenging scenarios, such as a player yelling at the umpire. It could be hypothesised that the participants would respond more appropriately to challenging match scenarios after watching the VSM video or that an increase in the use of game management skills, such as a strong voice and whistle, would result in lower abuse rates. Frequency of abuse and participant responses to abuse were not

measured as it was predicted that the frequency of abuse would decrease significantly once players, coaches and spectators noticed the large camcorder and tripod on the sideline of the court. As predicted, the presence of the camcorder was noted by players, coaches and spectators almost immediately, and no events of abuse or difficult behaviour were witnessed by the researcher during the study. To minimise the impact of this limitation, participants were asked to report how they would respond to challenging written scenarios and to discuss the frequency of abuse they experienced, in the semi-structured interview. Any future research aiming to assess abuse rates as an outcome should consider the potential influence of a recording device on the target behaviour.

Future Research

VSM effectiveness. Video self-modelling can be employed as Positive self-review (PSR) or Feedforward (FF). In the current study, it was predicted that participants may be able to perform effective game management skills out of context or with external prompts; however, they would not be able to perform those skills in the context of an abusive player, coach or spectator during an actual match. As such, FF VSM was utilised. The FF VSM videos showed participants using game management skills in response to seven challenging scenarios, such as a coach yelling at them. Behavioural data was collected to assess changes in specific and overall game management skills. However, as participants did demonstrate some game management skills during baseline, especially the use of Whistle, a PSR VSM intervention may have been suitable.

Future research could therefore assess the effects of a PSR VSM intervention in this context. This would involve filming participants in the process of umpiring and showing them the best performances of each game management skill. Findings from such future research could help to establish the potential for the use of PSR VSM to improve the game

management skills of adolescent umpires, from the perspective that this population already possess some level of these skills.

Future VSM research could also explore the required or optimal intervention time for a VSM intervention. Currently, there are no empirically established guidelines for the optimal total number or frequency of VSM viewings, length of VSM video, or length of VSM intervention. Dowrick (1997) used only one session of a 90-second VSM, while others have used multiple sessions over multiple days (Dowrick & Dove, 1980; Law & Sté-Marie, 2005; Melody, 1990). Suggestions that have been made in the literature (Buggey & Ogle, 2012; Dowrick, 1983) are lacking empirical evidence. Exploring this area could establish some guidelines for treatment length or frequency, so that the effectiveness of future VSM interventions would not be compromised by inadequate opportunities for clients or participants to attend to the content of the VSM video.

Measures development and selection. The current study aimed to measure satisfaction with game management skills using a single-item measure. The measurement of satisfaction may be important to the umpire retention literature, as satisfaction with activities appears to be positively associated with both motivation and retention rates (Bang et al., 2012; Bang & Ross, 2009).

Single-item measures may be as reliable as multi-item measures (Nagy, 2002) but are not as commonly used. In future, a multiple-item measure could be used to assess changes in global satisfaction with umpiring, in addition to single-item measures assessing changes in satisfaction with the target behaviour, social atmosphere, organisational support, and opportunities for skill development. The use of more comprehensive satisfaction measures could evaluate the potential of a VSM intervention or other interventions to increase satisfaction with target skills. Future findings may be important because satisfaction with

umpiring may mediate the relationship between motivation and retention of volunteers (Bang et al., 2012).

The specificity of self-efficacy measures should also be considered when assessing changes in self-efficacy in VSM research. The current study used both a multiple-item general measure of self-efficacy to umpire and a three-item specific measure of self-efficacy to manage challenging match scenarios. Previous VSM studies assessing changes in self-efficacy have produced conflicting findings about the relationship between performance and self-efficacy, and have also used either general and specific measures of self-efficacy (e.g. Clark & Sté-Marie, 2007; Sté-Marie, Rymal, et al., 2011). Future research could investigate whether VSM interventions are indeed capable of raising self-efficacy beliefs about the target behaviours and, if this is the case, whether this effect generalises to beliefs about other behaviours.

Conclusion

Findings from this study indicated that FF VSM has potential for further use with adolescent umpires. Increases in specific game management skills were observed across participants, including Whistle, Hand Signals, Body, Voice and Setting Penalties skills. However, these increases may not be solely due to the FF VSM intervention as they may also be accounted for by observation effects, practice effects or confounding variables. Increases in self-report ratings of self-efficacy and satisfaction with game management skills were observed for the majority of participants. Intrinsic motivation ratings decreased for most participants. Qualitative findings highlighted the importance of social recognition, social status and peer affiliations in the recruitment and retention of adolescent umpires, suggesting that sports organisations could look towards emphasising opportunities for adolescent umpires to achieve in sport, to make connections, to receive recognition for their umpiring, and to socialise with other umpires.

The current study also demonstrated that there may be opportunities for sports organisations to use video-modelling and VSM in the training of developing umpires. In the current study, ceiling effects, continuous coaching of the participants, inadequate behavioural definitions, and participant absences did not allow for a rigorous evaluation of the VSM intervention. Future work could minimise these issues by using less experienced umpires, developing stricter criteria for skills, removing standard coaching received by participants, or further clarifying operational definitions. There is also potential for the assessment of PSR VSM with developing umpires. Given the high attrition rates of young umpires, the susceptibility of adolescent umpires to the effects of stress, burnout and drop-out, and the abuse of umpires that is documented in the literature, further evaluation of PSR and FF VSM interventions for umpires is recommended.

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Appendix A: Effective Game Management

INTERNATIONAL NETBALL FEDERATION

EFFECTIVE GAME MANAGEMENT

As well as using the voice and whistle for penalising infringements and awarding penalties, Umpires should have a range of strategies to use in a game to ensure players are aware of the standards required of them. How an Umpire uses these to maintain good control and to minimise infringements will often be a mark of the competence of the Umpire (as well as reflect the respect the players have for the Umpire).

These strategies may include the following:

- Use of voice (other than for infringements & penalties) ie 'informal advice'
- Change of tone in voice, which may include deliberate pause and/or more deliberate whistle
- Calling 'Time' to speak to player/s
- Advancing a penalty (as in Rule 19.3, 19.2 and 20.1.1)
- Warning a player (Rule 20.1)
- Suspending a player (Rule 20.2)
- Ordering a player off (Rule 20.3)

Normally an Umpire will work through these strategies in roughly the order indicated unless an offence is serious enough to require a higher level of discipline.

Use of Voice (including change of tone, use of pause etc)
Umpires should have a range of expressions they can use to indicate to players they need to change their behaviour. The important thing is to ensure there are further levels that can be used if players do not respond!

- Use short, clear instructions; useful phrases are 'tidy up your Contact', 'get your distance right', 'wait for the whistle' (in reference to Breaking)
- Do not use phrases such as 'no more Contact', 'stop Breaking' - these could be misinterpreted as a warning and what will you do if they do not stop?
- Varying the tone used and use of pauses all adds 'a difference' that players will note

Calling 'Time' to speak to player/s

Holding the game adds a degree of seriousness that makes a penalty more effective. Everyone (including the coach) knows the Umpire considers it important enough to stop play. If more than one player from the same team is involved, including the Captain in the discussion may also be useful.

Advancing the Penalty
When may 'Advancing the Penalty' be used?

The Rule Book specifies the following:	
Rule 19.3	'Dispute with an Umpire' lists 'advancing the penalty' as an option.
Rule 19.2	States that 'the incorrect setting or taking of a penalty despite clear direction and indication by the Umpire' shall result in the infringer being penalised as 'a disputing player'.
Rule 20.1.1	States 'if a player continues to infringe after earlier penalties, or the Umpire considers the normal penalty (including the advancing of the penalty) is insufficient, the Umpire may issue a warning to the player concerned.'

Notes to above:

- Rule 19.3 is clear – the umpire may take whatever action is considered appropriate. One possible action is to advance the penalty.
- Rule 19.2 is clear that it should be considered similarly to 19.3. Hence advancing the penalty is an option the umpire may use.

INTERNATIONAL NETBALL FEDERATION

EFFECTIVE GAME MANAGEMENT

- Rule 20.1.1 is less clear as there is no specific mention of advancing a penalty for an infringement except for the two listed above (as 'Dispute with an Umpire'). However, the rule seems to suggest that advancing a penalty may be used in other circumstances, although this is not specifically mentioned anywhere else in the rule book.

Guidelines for advancing a penalty are given below. With the exception of Rules 19.3 and 19.2, advancing a penalty will not normally be used. If used relatively rarely, it can be an effective tool in advising a player of the urgent need to change their behaviour on the Court. Umpires should be careful to treat all players and positions fairly and equally.

If a penalty is to be advanced, the following should be considered:

- Do not over-use advancing as it will lose its effectiveness
- Make sure that players are aware the penalty has been advanced and why – if necessary hold 'Time' to ensure it is advanced correctly
- Note that the penalty is advanced; hence it must be set correctly in the new position. Thus for a Penalty Pass/Shot the infringer must move to the new position (if the new position is in an area where the infringer is not permitted, the infringer moves to the edge of their playing area and takes no part in play until the ball is thrown)
- Distance advanced – a suggested guideline through the Court is not more than half a Third. An umpire can only move the penalty within the half they control, but the co-Umpire may advance the penalty further (the total distance should be within the guideline). Umpires are advised to work together and to co-operate with each other
- When advancing a penalty from the Goal Third into the Goal Circle, it will not be usual to advance it to near the Goalpost.

Warning

The Rule Book does not offer any detailed guidelines as to how this should be handled. The following are suggested:

- A Warning would not normally be the first step unless the incident is serious enough to require this
- Use clear, consistent language. Ensure the word 'Warning' is used and the player is advised of the behaviour for which the Warning was given and what action will be taken if they infringe further. It is useful to hold 'Time' while giving a Warning
- Be clear about what repeated or deliberate infringements might lead to a Warning. Umpires are often quick to issue a warning for relatively minor offences (such as Breaking) but fail to deal with more serious repeated infringements (such as hitting the shooter's arm/ball at almost every shot, deliberate Obstructing etc). For Minor Infringements options such as awarding a Penalty Pass could be considered
- There is no such thing as a 'first Warning'! Only one should be given – and acted upon if there is any repetition of the behaviour that caused it to be given
- Rule 20.1.3 makes it clear that a Warning is considered to have been made jointly by the two Umpires (although the co-Umpire is not bound by it). It is important that the co-Umpire is aware that a Warning has been given and the reasons for it.

Suspension

Although the suspension a player is relatively rare, Umpires should not hesitate to use this when appropriate. If a Warning has been given, a Suspension would be expected to follow if further infringing occurs. The following guidelines should be used:

- Suspension would not normally be the first step unless the incident is serious enough to require this
- The Umpire should hold 'Time' while advising the player of the suspension and the reasons
- The length of time for the suspension should be relative to the seriousness of the infringing. If other disciplinary measures have been used appropriately there seems little point in sending a

INTERNATIONAL NETBALL FEDERATION

EFFECTIVE GAME MANAGEMENT

player off for 1 or 2 goals or for 30 seconds. A suggested minimum is 3 goals or 1 minute, while a more serious offence may require longer (say 5 goals or 2 minutes)

- If appropriate, the Umpires can work together to advise the Timekeepers and Scorers of the details. The Reserve Umpire is responsible for the oversight of the suspended player while this player is off the Court
- A suspended player is able to join the rest of the team during an interval but not during any stoppages
- Care should be taken if it is necessary to suspend the same player twice in the same game. The Rule Book does not address this but undoubtedly a second suspension (whether for the same or different reasons) would constitute a serious offence. As such it would require a longer suspension or more likely result in an Ordering Off.

Ordering Off

The procedures are similar to above except the player is sent to the Team Bench for the remainder of the match and may not return to the game.

Appendix B: HEC Ethical Approval

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2015/28

13 April 2015

Seonaid Palmer
School of Health Sciences
UNIVERSITY OF CANTERBURY

Dear Seonaid

The Human Ethics Committee advises that your research proposal "Evaluating the effects of video self-modelling in the teaching of game management skills with adolescent umpires" has been considered and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 8 April 2015.

Best wishes for your project.

Yours sincerely

Lindsey MacDonald
Chair
University of Canterbury Human Ethics Committee

Appendix C: Information Sheet for Chair of Board of Trustees

Seonaid Palmer

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

01/03/2015

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Information Sheet for Chair of Board of Trustees of [the local] Netball Centre

My name is Seonaid Palmer and I am a post graduate student at the College of Education, University of Canterbury, undertaking my Masters' of Science thesis. For my thesis project, I am interested in using Video Self-Modelling (VSM) in teaching umpires game management skills in young netball umpires. This project should be of benefit to umpires in developing their skills for managing difficult game situations.

I would like to invite you and the [local] Netball Centre to participate in this study. Up to twelve umpires from [the local Netball Centre] will be recruited for the study with involvement throughout the season. If you agree to take part, it will involve the following for umpires/umpire coaches who participate:

- All umpires will complete questionnaires on satisfaction with umpiring performance, on belief in their ability to manage difficult game situations, and on their motivation to umpire, as well as a short interview involving a discussion of their attitudes around umpiring.

- The filming of part netball games umpired by the participants throughout the season. I will do the filming.

- The filming of participants performing game management skills, such as a short, sharp whistle blow, clear hand signals and advancing a penalty. Footage will be used to create a video, and may entail editing in other netball match footage, to produce the best performance of game management skills by each umpire. Participants will view the videos several times a week for approximately six weeks, scheduled around other netball commitments.

- I will take responsibility for organising the equipment and assessment measures needed with minimal disruption to normal umpiring procedures. The expectations are that umpire coaches will be responsible for the normal coaching of umpiring skills.

Participation is voluntary. Your organisation can withdraw access to participants and [the local] Netball Centre facilities at any time, until data collation. All data gathered in this study will be confidential to the researcher, supervisory team and one trained observer, and stored

in locked storage at the University of Canterbury. The observer will assist me in coding the videos at the University of Canterbury and has signed a confidentiality clause.

Your anonymity in presentations and/or publications of the findings will be protected. All raw data will be held securely and kept for a minimum period of 5 years following completion of the project and then destroyed. My thesis, when completed, will be publically available in the UC Library. The findings may be published in journal articles and presented at conferences, however all names and features will be changed so the organisation, umpires, umpire coaches and volunteers cannot be identified.

Video footage taken at the [local] Netball Courts, of volunteers roleplaying as coaches, umpires, players and spectators, may be used in future umpiring workshops and/or presentations to help other developing umpires. Video footage of actual games or [local] Netball Centre umpires will not be used outside of the project. The videos will be kept by my supervisory team and myself. You will be offered a summary of the findings.

If you have any questions about the study, please contact me (details above) or my Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If you have a complaint about the study, you may address your concerns to the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch.
Email: human-ethics@canterbury.ac.nz

If you agree to participate in this study and/or for footage taken at the [local] Netball Centre to be used, please complete the attached consent form and return it to me in person the next time you see me. Thank you for considering this invitation to participate.

Appendix D: Consent Form for Chair of Board of Trustees

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Consent Form for Chair of the Board of Trustees

- I have been given information on the research study to be undertaken and I understand the requirements and processes involved in this project. I have had the opportunity to ask questions and I have received answers to these.
- I understand that I may withdraw access to the Netball Centre and umpires at any time until data collation.
- I understand that any information or opinions I provide will be kept confidential to the researcher team and that any published or reported results will not identify me or my organisation.
- I understand that any information collected about umpires and the video footage taken at [the local] Netball Courts of actual umpires and netball games will not be told or shown to anyone outside the supervision team and the trained observer, and it will be stored in locked storage at the University of Canterbury.
- I understand that all raw data will be held securely and kept for a minimum period of 5 years following completion of the project and then destroyed. This is standard procedure in accordance with the University of Canterbury Policy.
- I understand that findings and/or video footage of roleplaying volunteers may be shown at future workshops, conferences and /or presentations to help umpire development and I understand that Seonaid Palmer and the supervisory team will keep the videos.
- I understand that if I require further information I can contact the researcher, Seonaid Palmer or her Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If I have any complaints, I can contact the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or email: human-ethics@canterbury.ac.nz.

By signing below, I agree to allow access to participants and facilities for this research project.

Chair's Name: _____

Signature: _____

Date: _____

By signing below, I agree to the use of video footage in future workshops and/or conferences.

Chair's Name: _____

Signature: _____

Date: _____

Appendix E: Information Sheet for Umpire Allocator

Seonaid Palmer

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Information Sheet for the Umpire Allocator of [the local] Netball Centre

My name is Seonaid Palmer and I am a postgraduate student at the College of Education, University of Canterbury, undertaking my Masters' of Science thesis. For my thesis project, I am interested in using Video Self-Modelling (VSM) in teaching umpires game management skills in young netball umpires. This should be of benefit to umpires in developing their skills for managing difficult game situations.

I would like to invite you and the [local] Netball Centre to participate in this study. Up to twelve umpires will be recruited for the study, and will be involved throughout the season. If you agree to take part, it will involve the following for you and the umpires/umpire coaches who participate:

- All umpires will complete questionnaires on satisfaction with umpiring performance, on self-efficacy, on belief in their ability to manage difficult game situations, and on motivation, as well as a short interview.
- You may be asked to allocate umpires to games which I can attend.
- You will be asked to contact potential participants via email.
- Parts of netball games umpired by the participants will be filmed throughout the season. I will do the filming.
- The filming of participants performing game management skills, such as a short, sharp whistle blow, clear hand signals and advancing a penalty. Footage will be used to create a video, and may entail editing in other netball match footage to produce the best performance of game management skills by each umpire. Participants will view the videos several times a week for up to six weeks, scheduled around other netball commitments.
- I will take responsibility for organising the equipment and assessment measures needed with minimal disruption to normal umpire coaching procedures. The expectations are that umpire coaches will be responsible for the normal coaching of umpiring skills.

Participation is voluntary. Your organisation can withdraw access to participants and/or facilities for the study at any time, until data collation. All data gathered in this study will be confidential to the researcher, supervisory team and one trained observer, and stored in locked storage at the University of Canterbury. The observer will assist me in coding the videos and has signed a confidentiality clause.

Your anonymity in presentations and/or publications of the findings will be protected. All raw data will be held securely and kept for a minimum period of 5 years following completion of the project and then destroyed. My thesis, when completed, will be publically available in the UC Library. The findings may be published in journal articles and presented at conferences, however all names and features will be changed so the organisation, umpires, umpire coaches and volunteers cannot be identified.

Video footage taken at [the local] Netball Courts, of volunteers roleplaying as coaches, players, umpires and spectators, may be used in future umpire workshops to help other developing umpires. Video footage of actual netball games or umpires will not be used outside of the project. The videos will be kept by the supervisory team and myself. You will be offered a summary of the findings.

If you have any questions about the study, please contact me (details above) or my Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If you have a complaint about the study, you may address your concerns to the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch.
Email: human-ethics@canterbury.ac.nz

If you agree to participate in this study and/or for video footage taken at the [local] Netball Centre to be used, please complete the attached consent form and return it to me in person the next time you see me. Thank you for considering this invitation to participate.

Appendix F: Consent Form for Umpire Allocator

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Consent Form for Umpire Allocator

- I have been given information on the research study to be undertaken and I understand the requirements and processes involved in this project. I have had the opportunity to ask questions and I have received answers to these.
- I understand that I may withdraw access to the Netball Centre and umpires at any time, until data collation.
- I understand that any information or opinions I provide will be kept confidential to the researcher and that any published or reported results will not identify me or my organisation.
- I understand that any information collected about umpires and the video footage of actual netball games and umpires taken at [the local] Netball Courts will not be told or shown to anyone outside the supervision team and the trained observer, and it will be stored in locked storage at the University of Canterbury.
- I understand that all raw data will be held securely and kept for a minimum period of 5 years following completion of the project and then destroyed. This is standard procedure in accordance with the University of Canterbury Policy.
- I understand that findings and/or video footage of roleplaying volunteers may be shown at future workshops, conferences and /or presentations to help umpire development and I understand that Seonaid Palmer and the supervisory team will keep the videos.
- I understand that if I require further information I can contact the researcher, Seonaid Palmer or her Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If I have any complaints, I can contact the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or email: human-ethics@canterbury.ac.nz.

By signing below, I agree to participate in this research project.

Umpire Allocator's Name: _____

Signature: _____

Date: _____

By signing below, I agree to the use of video footage in future workshops and/or conferences.

Umpire Allocator's Name: _____

Signature: _____

Date: _____

Appendix G: Information Sheet for Participants

Seonaid Palmer

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Information Sheet for Umpires

I am a postgraduate student at the College of Education, University of Canterbury, undertaking my Masters' of Science thesis. For my thesis project, I am interested in using Video Self-Modelling (VSM), as an intervention to teach umpiring skills in young netball umpires. This project may be of benefit to you as it should help to develop your skills for managing difficult game situations.

I would like to invite you to participate in this study. If you agree to take part you will be asked to do the following:

- The completion of one question on the satisfaction of your umpiring performance, three questions your belief in managing difficult game situations, up to 13 questions on your beliefs in your umpiring skills, and five questions on your motivation to umpire. This will take approximately 30 minutes, and occur at the beginning and end of the project. This will take place at the [local] Netball Centre.

- The filming of part of the first netball game you umpire in the 2015 netball season and other games that you umpire throughout the season, for several weeks. This filming will take place to measure any changes in your game management skills over the netball season.

- The filming of you performing game management skills such as a short, sharp whistle blow, clear hand signals and advancing a penalty. This footage will be used to create a personal video, and may entail editing in other netball match footage. I will do this with you. The aim of the editing process will be to produce your best performance of game management skills.

- You will be requested to then view your video a number of times each week for up to six weeks.

Participation is voluntary. You can withdraw from the study at any time until data collation. All data gathered in this study will be confidential to the researcher, supervisory team and one trained observer. The observer will assist in coding the videos at the University of Canterbury and will have signed a confidentiality clause. Your anonymity in any presentations and/or publications of the findings will be protected. All raw data will be held securely and kept for a minimum period of 5 years following completion of the project and

then destroyed. My thesis, when completed, will be publically available in the UC Library. The findings may be published in journal articles and presented at conferences, however all names and features will be changed/coded so you cannot be identified. Video footage of you will not be shown to anyone outside of the supervisory team and the trained observer. Seonaid and the supervisory team will keep the videos.

If you have any questions about the study, please contact me (details above) or my Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If you have a complaint about the study, you may address your concerns to: The Chair, UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch, Email: human-ethics@canterbury.ac.nz

If you agree to participate in this study, please complete the attached consent form and return it to me the next time you see me in person. Thank you for considering this invitation to participate.

Appendix H: Assent Form for Participants

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Assent Form for Umpires

- I have been given a full explanation of this research study and have been provided with the chance to ask questions. I understand what will be required if I agree to participate in the project.
- I understand that my participation is voluntary. I may withdraw any time until data collation.
- I understand that videoing will be arranged around my Saturday netball commitments and practices, and that viewing of my videos will take place throughout the week and/or on a Saturday.
- I understand that any information or opinions I provide will be kept confidential to the researcher and the supervisory team and that any published or reported results will not identify me or the netball association. I understand that the thesis is a public document and will be available through the UC Library.
- I understand that any information collected about me and the video footage of me taken at [the local] Netball Courts will not be told or shown to anyone outside the supervision team and a trained observer, and it will be stored in locked storage at the University of Canterbury.
- I understand that Seonaid will not use my name, the name of my coach or netball centre in the thesis, any publications or conference presentations.
- I understand that a copy of my video and a summary of results of the project will be given to me. Seonaid and the supervisory team will keep the videos.
- I understand that findings may be used at presentations and/or future workshops for umpire development.
- I understand that all raw data will be held securely at the University of Canterbury and kept for a minimum period of 5 years following completion of the project and then destroyed. This is standard procedure in accordance with the University of Canterbury Policy.

- I understand that if I require further information I can contact the researcher, Seonaid Palmer or her Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If I have any complaints, I can contact the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or email: human-ethics@canterbury.ac.nz.

By signing below, I agree to participate in this research project.

Umpire's Name: _____

Signature: _____

Date: _____

Appendix I: Information Sheet for Parents/Guardians of Participants

Seonaid Palmer

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Information Sheet for Parents/Guardians of Umpires

My name is Seonaid Palmer and I am a postgraduate student at the College of Education, University of Canterbury, undertaking my Masters' of Science thesis. For my thesis project, I am interested in using Video Self-Modelling (VSM) as an intervention to teach umpiring skills in young netball umpires. This project may benefit your daughter in developing her game management skills.

I would like to invite your daughter to take part in this study. If they agree to take part they will be asked to do the following:

- Your daughter will complete questionnaires on satisfaction of umpiring, on belief in her ability to manage difficult game situations, and on her motivation to umpire. This will take approximately 30 minutes, and occur twice during the 2015 netball season. Your daughter will also take part in a short interview about her umpiring experience.
- Your daughter will be filmed for approximately ten minutes per week as they umpire a netball game, throughout the season, for approximately six weeks. I will do the filming.
- Your daughter will be filmed performing game management skills, such as a short, sharp whistle blow, clear hand signals and advancing a penalty. This footage will be used to create a video, and may entail editing in other netball match footage to produce the best performance of game management skills by your daughter. Your daughter will view the videos several times a week.
- I will organise the equipment and questionnaires needed with minimal disruption to normal umpire coaching procedures. The expectations are that her umpire coach will be responsible for the normal coaching of umpiring skills.

Please note that participation in this study is voluntary. If your daughter does participate, you have the right to withdraw her from the study at any time, until data collation. All data gathered in this study will be confidential to the researcher, supervisory team and one trained observer. The observer will code the videos at the University of Canterbury and has signed a confidentiality clause. The anonymity of your daughter in presentations and/or publications of the findings will be protected. All raw data will be held securely and kept for a minimum period of 5 years following completion of the project and then destroyed. My thesis, when completed, will be publically available in the UC Library. The findings may be published in journal articles and presented at conferences, however all names and features will be changed

so your daughter cannot be identified. Your daughter will be provided with a copy of her video. Video footage of your daughter will not be shown to anyone outside of the supervisory team and the trained observer. The videos will be kept by my supervisors and myself.

If you have any questions about the study, please contact me (details above) or my Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz).. If you have a complaint about the study, you may address your concerns to the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch, email: human-ethics@canterbury.ac.nz

If you agree for your daughter to participate in this study, please complete the attached assent form and return it to me in the envelope provided by the 27th of April. Thank you for considering this invitation to participate.

Appendix J: Consent Form for Parent/Guardians of Participants

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Consent Form for Parents/Guardians of Umpires

- I have been given a full explanation of this research study and have been provided with the opportunity to ask questions.
- I understand what will be required of my daughter if they agree to take part in this research study.
- I understand that my daughter's participation is voluntary and that they may withdraw from the study until data collation.
- I understand that videoing will all be arranged around my daughter's Saturday netball commitments and practices.
- I understand that any information or opinions my daughter provides will be kept confidential to the researcher and that any published or reported results will not identify me or my daughter.
- I understand that any information collected about my daughter and the video footage of my daughter, taken at [the local] Netball Courts, will not be told or shown to anyone outside the supervision team and the trained observer, and it will be stored in locked storage at the University of Canterbury.
- I understand that the thesis is a public document and will be available through the UC Library. A copy of my daughter's video and a summary of results of the project will be given to my daughter. Seonaid and the supervisory team will keep the videos.
- I understand that findings may be shown at future presentations and/or umpire workshops to help umpire development.
- I understand that all raw data will be held securely and kept for a minimum period of 5 years following completion of the project and then destroyed. This is standard procedure in accordance with the University of Canterbury Policy.
- I understand that I can request a summary of the findings of the study and have written my email address below.

- I understand that if I require further information I can contact the researcher, Seonaid Palmer or her Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If I have any complaints, I can contact the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or email: human-ethics@canterbury.ac.nz.

By signing below, I agree for my daughter to participate in this research project.

Parent/Guardian's Name: _____

Signature: _____

Date: _____

Appendix K: Information Sheet for Umpire Coaches

Seonaid Palmer

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Information Sheet for Umpire Coaches

My name is Seonaid Palmer and I am a post graduate student at the College of Education, University of Canterbury, undertaking my Masters' of Science thesis. For my thesis project, I am interested in using Video Self-Modelling (VSM) as an intervention with young netball umpires. This should be of benefit to umpires in developing their skills for managing difficult game situations.

I would like to invite you to participate in this study. Up to twelve umpires will be recruited for the study, and will be involved for approximately six weeks. If you agree to take part, it will involve the following:

- All umpires will complete questionnaires on satisfaction with umpiring performance, on belief in their umpiring performance, on belief in their ability to manage difficult game situations, and on motivation.
- The filming of part netball games umpired by the participants will take place throughout the season. I will do the filming.
- The filming of participants performing game management skills, such as a short, sharp whistle blow, clear hand signals and advancing a penalty. Footage will be used to create a video, and may entail editing in other netball match footage, to produce the best performance of game management skills by each umpire. Participants will view the videos several times a week for up to six weeks.
- I will organise the equipment and assessment measures needed with minimal disruption to normal umpire coaching procedures.
- The expectations are that you as an umpire coach will be responsible for the normal coaching of umpiring skills, and may support the umpires should they feel anxious about being filmed while they umpire.

Your cooperation is sought. No data will be collected from you.
All data gathered in this study will be confidential to the researcher, supervisory team and one trained observer. The observer will code the videos at the University of Canterbury and has signed a confidentiality clause. Your anonymity in presentations and/or publications of the findings will be protected. All raw data will be held securely and kept for a minimum

period of 5 years following completion of the project and then destroyed. My thesis, when completed, will be publically available in the UC Library. The findings may be published in journal articles and presented at conferences, however all names and features will be changed so you or your umpires cannot be identified. Video footage of actual netball games and umpires will not be used outside of the project. Video footage will be kept by myself and the supervisory team.

If you have any questions about the study, please contact me (details above) or my Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If you have a complaint about the study, you may address your concerns to the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch, email: human-ethics@canterbury.ac.nz

If you agree to participate in this study, please complete the attached consent form and return it to me in person the next time you see me. Thank you for considering this invitation to participate.

Appendix L: Consent Form for Umpire Coaches

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Consent Form for Umpire Coaches

- I have been given a full explanation of this research study and have been provided with the opportunity to ask questions.
- I understand what will be required of me during this research study.
- I understand that my umpires' participation is voluntary and that they may withdraw from the study at any time until data collation.
- I understand that Seonaid will organise equipment and that assessment of measures and videoing will be arranged around my normal umpire coaching routines and practices and that Seonaid will be responsible for the viewing of the umpires' videos.
- I understand that the thesis is a public document and will be available through the UC Library.
- I understand that the video footage of actual netball games and umpires taken at [the local] Netball Courts will not be told or shown to anyone outside the supervision team or the teacher, and it will be stored in locked storage at Canterbury University.
- I understand that findings may be shown at future workshops, conferences and /or presentations to help umpire development and the videos will be kept by Seonaid Palmer and the supervisory team.
- I understand that all raw data will be held securely and kept for a minimum period of 5 years following completion of the project and then destroyed. This is standard procedure in accordance with the University of Canterbury Policy.
- I understand that if I require further information I can contact the researcher, Seonaid Palmer or her Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If I have any complaints, I can contact the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or email: human-ethics@canterbury.ac.nz.

By signing below, I agree to participate in this research project.

Umpire Coach's Name: _____

Signature: _____

Date: _____

Appendix M: Information Sheet for Volunteers

Seonaid Palmer

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Information Sheet for Volunteers

My name is Seonaid Palmer and I am a post graduate student at the College of Education, University of Canterbury, undertaking my Masters' of Science thesis. For my thesis project, I am interested in using Video Self-Modelling (VSM), as an intervention to teach umpiring skills in young netball umpires. This should be of benefit umpires by developing their skills for managing difficult game situations.

I would like to invite you to participate in this study. If you agree to take part you will be asked to be filmed while acting as a coach, player, umpire or spectator of netball. I will write some scripted comments for acting out these roles, such as "Aw, c'mon ref! Put your glasses on!", I will provide propos, and I will support you in acting out the scenarios.

Filming will take place at the [local] Netball Courts, at a time organised by you and me. I will do the filming. This may take up to one hour.

This footage will then be edited with footage of young umpires' responses, to make several short videos. The umpires will watch the videos several times a week and will receive a copy of their own edited video.

Video footage may be used in future workshops and/or presentations to help other developing umpires. The videos will be kept by my supervisory team and myself.

If you have any questions about the study, please contact me (details above) or my Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If you have a complaint about the study, you may address your concerns to the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch, email: human-ethics@canterbury.ac.nz

If you agree to acting and being videoed for this study and/or for your video footage to be used in future workshops and/or conferences, please complete the attached consent form and return it to me in person the next time you see me. Thank you for considering this invitation to help with this project.

Appendix N: Consent Form for Volunteers

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Consent Form for Volunteers

- I have been given a full explanation of this research study and have been provided with the opportunity to ask questions. I understand what will be required of me if I agree to take part in this research study.
- I understand that any published or reported results will not identify me. I understand that the thesis is a public document and will be available through the UC Library.
- I understand that the video footage may be shown at future workshops to help umpire development, and/or presentations. I will be acknowledged for acting in the videos.
- I understand that video footage will be kept by Seonaid and her supervisory team.
- I understand that if I require further information I can contact the researcher, Seonaid Palmer or her Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If I have any complaints, I can contact the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or email: human-ethics@canterbury.ac.nz.

By signing below, I agree to be filmed performing scripted scenarios of netball match situations.

Participant's Name: _____

Signature: _____

Date: _____

By signing below, I agree to the use of my video footage in future workshops and/or conferences.

Participant's Name: _____

Signature: _____

Date: _____

Appendix O: Confidentiality Agreement for Trained Observer

Seonaid Palmer

Telephone: 027 3704833

Email: seonaid.palmer@pg.canterbury.ac.nz

01/03/2015

The Effects of Video Self-Modelling as an Intervention in the Teaching of Game Management Skills of Adolescent Umpires

Confidentiality Agreement for Trained Observer

This project is being undertaken for a Masters' of Science thesis. My supervisors are Gaye Tyler-Merrick and Lawrence Walker.

The objectives of this study are to evaluate the effects of a Video Self-Modelling intervention with adolescent umpires in relation to the teaching of game management skills.

Your role will be to code video footage of the participants for game management skills. I will provide training for this task.

- I have been given information on the research study to be undertaken and I understand the requirements and processes involved in this project. I have had the opportunity to ask questions and I have received answers to these.
- I understand that all material I will be asked to view and record is confidential.
- I understand that the contents of the consent forms, audio files, video files or interview notes can only be discussed with Seonaid Palmer and her supervisors, Gaye Tyler-Merrick and Lawrence Walker.
- I will store all relevant material securely while it is in my possession.
- I will delete all interview and other relevant files from my computer after transcription.
- I will not keep any copies of the information nor allow third parties to access them.
- I understand that Seonaid Palmer and the supervisory team will keep the videos.
- I understand that if I require further information I can contact the researcher, Seonaid Palmer or her Senior Supervisor Lawrence Walker (lawrence.walker@canterbury.ac.nz). If I have any complaints, I can contact the Chair of the UC Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch or email: human-ethics@canterbury.ac.nz.

By signing below, I agree to the above conditions.

Observer's Name: _____

Signature: _____

Date: _____

Primary Researcher's Name:_____

Signature: _____

Date: _____

Appendix P: Demographic Questionnaire

Umpire Information Sheet

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CHRISTCHURCH NEW ZEALAND

Personal Information

Name: _____ Age: _____ Gender: M/F

Ethnicity: _____

Netball Information

How many years/seasons have you umpired netball for? _____

How old were you when you began to umpire? _____

Were you playing netball at the time you began to umpire? Yes/No

Do you currently play netball? Yes/No For how many years have you played? ____

Do you currently coach netball? Yes/No For how many years have you coached? ____

Will you umpire netball next year? Yes/No Will you play next year? Yes/No

Roughly how many hours a week do you spend umpiring a game of netball each week in winter? _____

Did you attend the workshop on Game Management on the 14th of May? Yes/No

Did you find this workshop useful for developing your skills? Yes/No

Appendix Q: Practical Centre Award (Game Management Section)

NETBALL NEW ZEALAND
Poitarawhiti Aotearoa

CENTRE UMPIRE AWARD
And /or
ENDORSEMENT REPORT
(Page 1/2)

Name		
Address		
Home Phone		
Mobile		**Email:**
Centre		
Pre requisites:	Theory Pass Date completed:	
Game Details	Date: Teams: Assessors Signatures (2)	
Result – circle one	Qualifying Award Endorsement	PASS/Not Yet Competent PASS/Not Yet Competent

	For a Pass all sections must be ticked	Tick if satisfactory	Comments
GAME MANAGEMENT			
Protocols	Using some correctly	☐	
Voice, whistle,	Clear, crisp whistle; audible calls with correct terminology most of the time	☐	
Hand signals	Using some	☐	
Centre Pass	Indicating all Centre Passes	☐	
Setting penalties-includes penalty pass, free pass, throw in, toss up,	Most set clearly, quickly and correctly	☐	
Stoppages and Discipline procedures	If using any, using correctly	☐	
UMPIRING TECHNIQUES			
Position & Timing	Generally level with or slightly ahead of	☐	

Appendix R: Behaviour Checklist Coding Sheet

Umpire name/code:
Date of footage:
Observer name:
Date coded:

Please see rate in conjunction with Operational Definitions information. Ratings should be based on a ten-minute segment for each umpire.

Skill	Opportunities/ 10 minutes	Performed	Percentage	Expected	Pass?
Protocols (before, intervals, injury)				80	
Whistle (CP, infringement, time, goal)				100	
Hand Signals (CP, infringement, time advantage)				100	
Voice (CP, infringement, advantage)				90	
Body (every 30 seconds – is the body straight, head up, shoulders back, eye contact?)				90	
Setting Penalties (free pass, penalty pass, throw in)				100	
Stoppages (blood, ball on court, injury)				80	
Discipline (informal warn, advance, warn)				80	

Appendix S: Operational Definitions of Skills

Operational definitions

Protocols before game: The umpire finds co-umpire, checks players for nails, uniform, jewellery, finds and checks ball, checks court, gets scorer, gets pink cards, asks for Captain, Primary Care. Umpire walks across the court with the ball to start the game (if walking umpire).
Protocols during the game: Umpire blows whistle for injuries, ball on court, blood, and intervals. Umpires meet in middle of court at the end of each quarter, remains together at intervals, check the score.
Protocols after the game: Umpires meet in the middle of the court, shake hands, get score card.

Whistle: whistle is loud and crisp. It is short at penalties, goals and CP, longer for intervals and stoppages, louder for a serious infringement.
Voice: voice is loud and clear, with correct terminology when calling penalties, calling the Centre Pass, calling advantage, holding the play for safety, and setting penalties.
Hand signals: hand signals are correct, strong and clear to players, for every penalty and advantage call made during the game, as well as intervals, re-starts, Centre Passes, injury, blood. See back of rule book for correct hand signals.
Body Language: umpire makes eye contact with co-umpire before Centre Pass, makes eye contact with players when setting penalties, stands up straight, with head up and shoulders back, facing the court.

Setting penalties: Penalties set in the correct place (where infringement happened), set quickly and clearly. Penalised player is standing beside and away from player taking the ball.
Stoppages: umpire stops game for ball on court, blood, major injury, restarts correctly.
Discipline: umpire gives informal warning, stronger informal warning, advances, gives warning, suspends and orders off correctly and appropriately. See discipline section of the rule book for discipline guidelines.

Appendix T: Self-Efficacy Questionnaire

Self-Efficacy Questionnaire

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CHRISTCHURCH NEW ZEALAND

For the following 13 statements, please rate how confident you are in your ability to perform each umpiring skill. 1 = Not confident, 5 = Very confident

I am confident that…

I understand the basic strategy of the game	1	2	3	4	5
I understand all the rules of netball	1	2	3	4	5
I understand proper officiating mechanics	1	2	3	4	5
I make critical decisions during competition	1	2	3	4	5
I make quick decisions	1	2	3	4	5
I am firm in my decisions	1	2	3	4	5
I am uninfluenced by pressure from coaches	1	2	3	4	5
I am uninfluenced by pressure from players	1	2	3	4	5
I am uninfluenced by pressure from spectators	1	2	3	4	5
I communicate effectively with coaches	1	2	3	4	5
I communicate effectively with other referees	1	2	3	4	5
I communicate effectively with players	1	2	3	4	5
I communicate effectively with auxiliary personnel (timers, scorers)	1	2	3	4	5

Based on the Referee Self-Efficacy Scale (Myers, Feltz, Guillén, & Dithurbide, 2012)

Appendix U: Motivation Questionnaire

Motivation Questionnaire

Please rate how well the following statements fit with how you feel about umpiring on the scale provided. 1 = Does not correspond well at all, 7 = Corresponds completely.

Why do you practice your sport (umpiring)?

Because it gives me pleasure to learn more about my sport.	1	2	3	4	5	6	7
Because I find it enjoyable to discover new performance strategies.	1	2	3	4	5	6	7
Because it is very interesting to learn how I can improve.	1	2	3	4	5	6	7
Because practicing sports reflects the essence of whom I am.	1	2	3	4	5	6	7
Because participating in sport is an integral part of my life.	1	2	3	4	5	6	7
Because through sport, I am living in line with my deepest principles.	1	2	3	4	5	6	7
Because I have chosen this sport as a way to develop myself.	1	2	3	4	5	6	7
Because I found it is a good way to develop aspects of myself that I value.	1	2	3	4	5	6	7
Because it is one of the best ways I have chosen to develop other aspects of myself.	1	2	3	4	5	6	7
Because I would feel bad about myself if I did not take the time to do it.	1	2	3	4	5	6	7
Because I feel better about myself when I do.	1	2	3	4	5	6	7

Why do you practice your sport (umpiring)?

Because I would not feel worthwhile if I did not.	1	2	3	4	5	6	7
Because people I care about would be upset with me if I didn't.	1	2	3	4	5	6	7

Because I think others would disapprove of me if I did not.	1	2	3	4	5	6	7
Because people around me reward me when I do.	1	2	3	4	5	6	7
I used to have good reasons for doing sports, but now I am asking myself if I should continue.	1	2	3	4	5	6	7
So that others will praise me for what I do.	1	2	3	4	5	6	7
It is not clear to me anymore; I don't really think my place is in sport.	1	2	3	4	5	6	7

Based on the revised Sport Motivation Scale (Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013).

Appendix V: Satisfaction Questionnaire

Satisfaction Questionnaire

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On the scale below, please rate how satisfied you are with your game management skills in the game you most recently umpired. 1 = not satisfied, 10 = very satisfied

Game management:

- strong whistle, clear hand signals, eye contact, loud voice
- change in tone of voice for more severe infringements
- holding time for delaying play, blood, ball thrown away, warning player/coach
- responding to captains in breaks/after game
- responding to abuse from players/coaches/spectators
- advancing or warning where needed

1 2 3 4 5 6 7 8 9 10

Appendix W: Scenario Questionnaire

Scenario Questionnaire

For each of the following scenarios, please rate how well you would be able to manage the situation, and write what you would do. 1 = I would not manage well, 10 = I would manage very well.

1. You penalise Wing Defence for stepping. She turns to you and loudly says "I didn't step! She pushed me! It's not fair! She pushed me!" You instruct her to stand down and she swears at you.

   1 2 3 4 5 6 7 8 9 10

_____
_____
_____

2. You penalise Goal Keeper for obstruction. You hear the coach of her team yell "Not fair! Are you blind ref?!"

   1 2 3 4 5 6 7 8 9 10

_____
_____
_____

3. It is half-time. The captain from one team approaches you. She says "I just came to tell you that the Wing Attack from the other team keeps pushing my players and swearing at them."

   1 2 3 4 5 6 7 8 9 10

_____
_____
_____

Appendix X: Participant Recording Sheet

Umpire Recording Sheet

Name: _____

Date	Number of times I watched my video

Appendix Y: Interview Script

Umpiring Interview

I'd like to talk with you about your umpiring experiences to get some more information as part of my project. It should take around fifteen minutes. If there is a question that you do not want to answer, then just let me know. Do you have any questions before we begin?

When did you begin umpiring?

Why did you begin umpiring? (a person? your netball team?)

Why do you continue umpiring?

What do you enjoy about it?

Is there anything that would make you enjoy it more?

What do you not like so much about umpiring?

Do you ever think of quitting?

Why might you quit?

What would make you stay?

Do you think umpiring is fun? Hard work? Why?

Who do you like having on the sideline? Your parents? Peers? Why?

Who do you not like on the sideline? Why?

Have you ever been abused as an umpire? What kind of abuse?

How do you usually cope with it?

Thank you for your time. Is there anything else you would like to say on these topics?

Appendix Z: Social Validity Questionnaire

Social Validity Questionnaire

I'd like to ask you a few questions about video self-modelling, to see how it was for you to use. Video self-modelling was just the part of the project were you watched a video of yourself performing skills like loud and sharp whistle blows and strong hand signals. It should only take a few minutes. Do you have any questions about this before we begin?

Did you find VSM useful or not useful?

How was VSM useful/not useful for you? (e.g. it showed me how to do it, it made me confident, it was too boring)

Would you ever use VSM again? Or not? Why? Why not?

What skills would you use it for?

Did you find VSM motivating? Or stressful? Why?

Thank you for your time. Is there anything else you would like to say about VSM?